

TAXATION

ALONG THE

OIL AND GAS

SUPPLY CHAIN

**International
Pricing Mechanisms
for Oil and Gas**



ENERGY CHARTER SECRETARIAT

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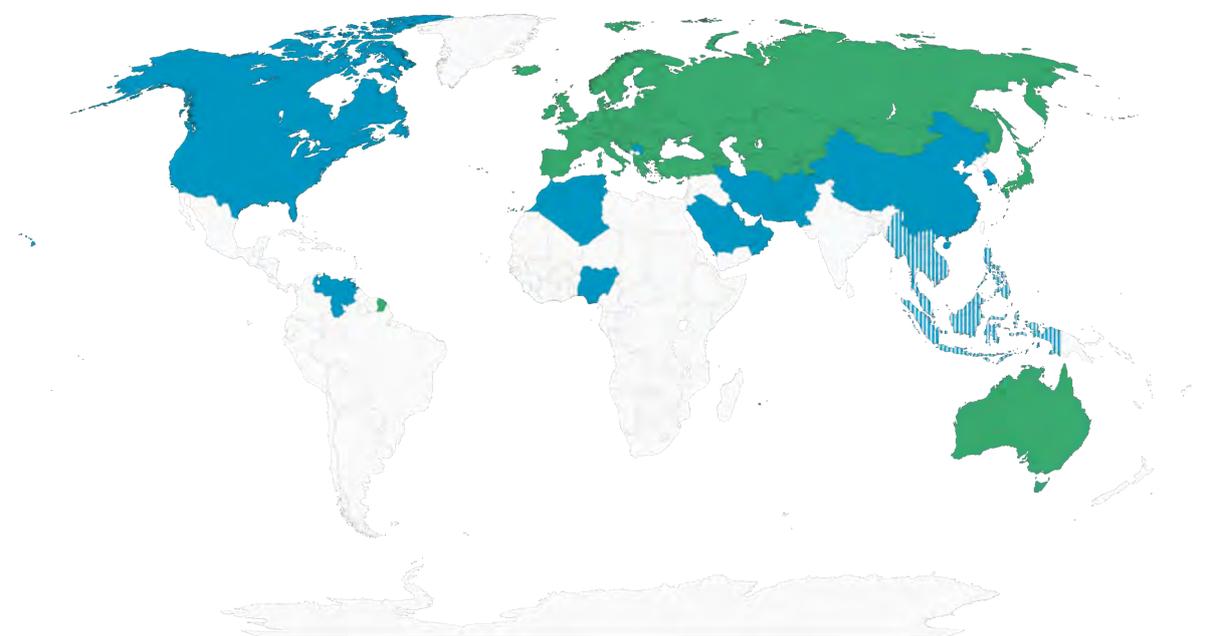
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THE ENERGY CHARTER TREATY

The Energy Charter Treaty is a unique legally-binding multilateral instrument covering investment protection, liberalisation of trade, freedom of transit, dispute settlement and environmental aspects in the energy sector. It is designed to promote energy security through the operation of more open and competitive energy markets, while respecting the principles of sustainable development and sovereignty over energy resources. The Treaty is the only agreement of its kind dealing with intergovernmental cooperation in the energy sector, covering the whole energy value chain (from exploration to end use) and all energy products and energy-related equipment.

Based on the Energy Charter of 1991, which was a political declaration signalling the intent to strengthen international energy ties, the Energy Charter Treaty was signed in December 1994 and entered into force in April 1998. To date, the Treaty's membership covers fifty-one states plus the European Communities, which together represent nearly 40% of global GDP. Twenty more states and ten international organisations have the status of observers.



■ Members of the Energy Charter Treaty:

Albania, Armenia, Austria, Australia, Azerbaijan, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, European Communities, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Kazakhstan, Kyrgyzstan, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Moldova, Mongolia, the Netherlands, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tajikistan, the former Yugoslav Republic of Macedonia, Turkey, Turkmenistan, Ukraine, United Kingdom, Uzbekistan

■ Observers:

States: Afghanistan, Algeria, Bahrain, China, Canada, Iran, Jordan, Korea, Kuwait, Morocco, Nigeria, Oman, Pakistan, Qatar, Saudi Arabia, Serbia, Tunisia, United Arab Emirates, United States of America, Venezuela (vertical stripes denote the countries of ASEAN)

International Organisations: ASEAN, EBRD, IEA, OECD, UN-ECE, World Bank, WTO, CIS Electric Power Council, BSEC, BASREC

FOREWORD

Oil and gas are taxed heavily along the supply chain in various ways and for different reasons. Tax revenues from oil and gas exports are a major source of revenue for the governments of oil and gas exporting countries and serve as a compensation for the depletion of a finite resource. In consumer countries revenues from taxes on gasoline and other fuels are often used to develop and maintain road infrastructure and to compensate for environmental impacts. Beyond that, these taxes are considered as a stable source of the budget of the government in view of the low elasticity of demand for oil and gas.

This study examines taxation along the oil and gas supply chain from upstream to downstream. In the upstream sector, taxes are only one – albeit an important – instrument of the rent sharing regime. Governments also receive rent through fees, rentals, bonuses, government takes / participations and other fiscal conditions in addition to taxes. In light of high oil and gas prices as well as the perceived implications of “peak oil theory”, the balance of power between governments and investors is tilting towards the government side.

In the downstream sector, a range of different categories of downstream taxation are applied to both petroleum products and natural gas, which may vary substantially between different products. This report looks into the arguments both against and in favour of such taxes. It also discusses the relationships between downstream taxation and the international prices of oil and natural gas.

The report was written by Professor Philip Wright and Dr Ian Rutledge of the University of Sheffield, and Mihar Kanai, Senior Expert, under the supervision of Ralf Dickel, Director for Trade and Transit. It greatly benefited from discussion with delegates from the Energy Charter member governments in the Trade and Transit Group meetings in February, June and October of 2008.

This report is made publicly available under my authority as Secretary General of the Energy Charter Secretariat and without prejudice to the positions of Contracting Parties or to their rights or obligations under the Energy Charter Treaty or the WTO agreements.



André Mernier
Secretary General
Brussels, November 2008

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EXECUTIVE SUMMARY

Oil and gas are taxed heavily along the supply chain in various ways and for different reasons. Tax revenues from oil and gas exports are a major source of revenue for the governments of oil and gas exporting countries serving as a compensation for the depletion of a finite resource. In consumer countries the revenue from taxes on gasoline and other transportation fuels is often used to develop and maintain road infrastructure, while taxes on energy consumption are considered as a stable source of the budget of the government in view of the low elasticity of demand. Increasingly, developed countries are taxing carbon fossil fuels as a means to discourage GHG emissions linked to energy consumption.

Upstream Taxation

Upstream taxation is about rent sharing between the government and the investor. The major economic rationale is to provide a rent to the state as a compensation for the depletion of its finite resources while giving the investor (the agent) enough incentives to develop them. Upstream taxes are only a part of the rent sharing regime, which includes fees, rentals, bonuses, government take / participation and other fiscal conditions in addition to taxes.

Chapter 1 looks into the 150 years of modern oil industry history, in which a number of upstream legal and taxation regimes have evolved. They are such legal frameworks as concessions, leases, licences, production sharing agreements and service contracts on the one hand; and royalties, petroleum revenue taxes, severance taxes, cost oil / profit oil and others as taxation regimes on the other.

As discussed in Chapter 2, the concept of royalty predates personal income taxes and corporate income taxes. Royalties can deter operation and investment if the rates are too high. Taxing profits is a better form of taxation because it does not distort economic decisions. Therefore, corporate taxes were subsequently introduced as a mean to tax profits from oil and gas production. The corporate tax was chosen for practical reasons of implementation as at that time, a legal framework and reliable administrative procedures for corporate tax had already been established.

Outside the USA, foreign investors operated under the concession system. In the beginning, concessions granted exclusive rights to explore and exploit oil or gas over wide areas for long-term periods to foreign companies. In return, host countries received rents, royalties, taxes, or fees. Later, concessions were for more limited areas and limited time span and were granted by competitive or at least negotiating mechanisms.

Following the move by governments of developing countries in the 1960s to claim sovereignty over their natural resources, Indonesia started using production sharing agreements (PSAs). PSAs quickly became a favoured legal framework for oil and gas development among developing countries.

PSAs keep ownership of resources and the management capacity of projects in the hand of the state. Licences normally grant a proprietary right while PSAs are contractual in nature.

Chapter 3 touches on double taxation issues in the oil and gas sector, while Chapter 4 examines recent developments in upstream taxation. With current high oil prices and prominent “peak oil theory”, the rent sharing between investors and governments is tilting

toward the government side. Fiscal and taxation regimes are getting tighter in the upstream bidding rounds across-the-board while changes on the existing contracts are taking place in some countries.

Nonetheless, much of the information on upstream taxation and rent sharing regimes is still hidden under the veil of national and corporate confidentiality in many countries. While it is necessary to protect the negotiation process, the resulting conditions and taxes require transparency for creating reliable tax system, collecting taxes, promoting investment and reducing corruption. (See Chapter 5)

Downstream Taxation

The downstream taxation part of this study examines in Chapter 6 the different categories of downstream taxation which are applied to both petroleum products and natural gas and the conventional arguments both against and in favour of such taxes.

The taxes on petroleum products and natural gas are all to be found in the category named by OECD, 'Taxes on Goods & Services'. Within this category, taxes on petroleum products and natural gas are concentrated within two sub-categories: 'Value Added Taxes' and 'Excises'. They may also appear in the category 'Customs and Import Duties'.

Special taxes on petroleum products are referred to as 'Excise Duties'. Excises are different from other taxes in the following ways:

- They are applied only to specific goods and services;
- In at least one important case (the USA) the income raised by taxation of fuel is earmarked for particular state and government expenditures;
- They are usually levied using an absolute rather than a relative scale; they are 'specific', not 'ad valorem');
- They can often represent a very significant proportion of final prices;
- Unlike VATs they are not refundable to intermediate users.

Four additional points can be made about excise taxes on natural gas:

- It is the practice of only a minority of countries;
- It is applied more to households than to industry;
- Rates vary very widely;
- In some cases the excise taxes are in fact environmental taxes.

Chapter 7, using a variety of case studies to highlight different issues, looks at the way downstream taxes are applied in eight contrasting Energy Charter member countries. The Energy Charter countries have a variety of downstream taxation approaches. Most of them – with the notable exception of the UK - apply different (lower) rates of excise tax to diesel compared with gasoline.

There is clear variance of ex-taxes prices for both gasoline and diesel between the countries, probably driven by cost, but it is small compared with the differences delivered by tax differentials.

Double taxation issues with respect to downstream taxation are about jurisdiction rather than about double taxation occurring in practice. Determining jurisdiction would seem to have generally accepted rules which are clear and reinforced by whether or not the service is classified as an export by a particular country.

The Impact of Taxation on International Pricing of Oil and Gas

Chapter 8 examines the relationships between downstream taxation and the international prices of oil and natural gas. In particular, taxes on gasoline and diesel have witnessed a notable divergence in the political response. Whereas the citizenry has become increasingly vocal in its antagonism towards high downstream taxes on petroleum products, the governments of some of the high-tax countries have suggested that high consumer prices were caused by producing countries, particularly OPEC. In so doing, they fail to acknowledge the crucially important role of taxes in the full chain of oil production, refining, transportation and distribution costs. In addition, downstream taxes are not only a major determinant of the price paid at the pump, but are also related to upstream prices in important ways.

Looking into relationships between downstream taxes and subsidies on one side and upstream oil and natural gas prices on the other, higher excise taxes on petroleum products mean lower demand for those products, lower demand for crude and lower crude prices. There is also an interesting paradox concerning the relationship between downstream taxes and the price elasticity of demand for crude oil: an oil-consuming country which has imposed a substantial excise tax on petroleum products is likely to be less demand responsive to an increase in the crude price than it was before the imposition of the excise tax and vice versa.

There is clear evidence of a politically expedient negative relationship between crude prices and gasoline taxes, particularly in the world's largest oil consumer, the USA. As the crude price increased, excise taxes were reduced, and visa-versa. Similarly, it was in an environment of extremely low upstream prices that governments like the UK were emboldened to increase excise taxes downstream, but increasing upstream prices since 1998 have seen a relative decline in the importance of downstream taxes in the UK's oil chain.

The question about subsidies is whether or not those countries that have fuel subsidies would have grown as fast and placed such high demand on world crude oil supplies. The early indications are apparently counter-intuitive as reductions in subsidies appear to have increased rather than reduced the demand for gasoline in China: the price control regime had caused shortages as refiners have incurred large losses – higher prices may well resolve the refining bottleneck.

In most major producing / exporting countries, domestic oil and gas prices can be very low without falling below the cost of production, and clearly stimulate consumption to levels above what it would otherwise be. This effect also contains the potential to affect world market prices by reducing surpluses available for export. However, consumption may be relatively restrained despite the lower than world market prices enjoyed by consumers in the country, in fact the domestic pricing of gas below prices applying in international trade actually may have positive benefit for world price levels: it may encourage producers to place more of their output on the world market. Data for three different oil chains, German, Japanese and the USA, suggests that the direction of causality goes from upstream prices to downstream taxes and not vice-versa.

The UK can serve as an example of how downstream taxes affect upstream taxes and vice versa, because the country is both a major producer of hydrocarbons and a major consumer. Changes in the UK's upstream taxation in relation to downstream taxation suggest a reciprocity between upstream and downstream taxation. Increasing levels of upstream taxation are generally associated with higher crude oil prices, which in turn reduce the economic space for raising taxes downstream. Reductions in upstream taxation are, in contrast, more likely to be driven by apparently detached upstream policy aimed, for example, at offering companies tax breaks to invest and produce more in a particular oil province.

1. INTRODUCTION TO UPSTREAM TAXATION

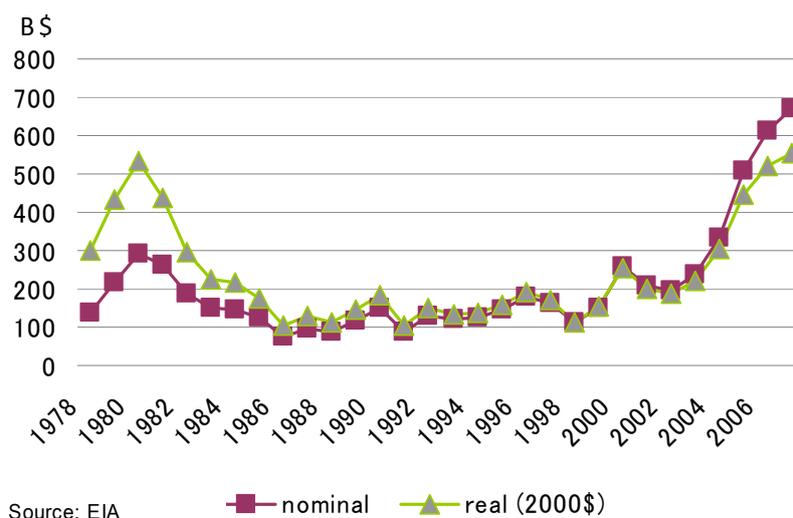
1.1 Rent Sharing

Oil and gas are taxed heavily along the supply chain from upstream to downstream in various ways for different reasons. Tax revenues from oil and gas production / exports are the main source of revenue for governments of oil and gas producing / exporting countries, while in oil and gas consuming / importing countries gasoline and other transportation fuels are often taxed to develop and maintain road infrastructure. Increasingly, developed countries are taxing carbon fossil fuels as a means to discourage energy consumption that causes climate change.

As opposed to taxes imposed on the downstream segment of the oil and gas supply chain, upstream taxation is all about rent sharing between the investor and the government. “Rent” is a concept in economics, representing the difference between the market price and the marginal cost¹. Therefore, rent can be taken as “surplus”. Upstream taxes are only a part of a rent sharing regime. Governments also take rent in the form of fee, rental, bonus and the government take / participation.

In light of high oil prices, revenues of oil producing countries have increased significantly in recent years. The Energy Information Administration (EIA) of the US Department of Energy (DOE) estimates OPEC revenue as the following. According to the EIA, not only has the OPEC revenue risen in nominal terms for the past several years but also the real-term revenue in 2007 has exceeded that for 1980 in the middle of the second oil crises. The second graph shows how the world oil surplus was distributed in 2004². According to Aoun, out of the total oil sales of \$2,525 billion in 2004, 47% went to the consuming country governments as tax, while the governments of the producing countries took 27%. Profits of oil companies accounted for 5% and the remaining 22% was cost.

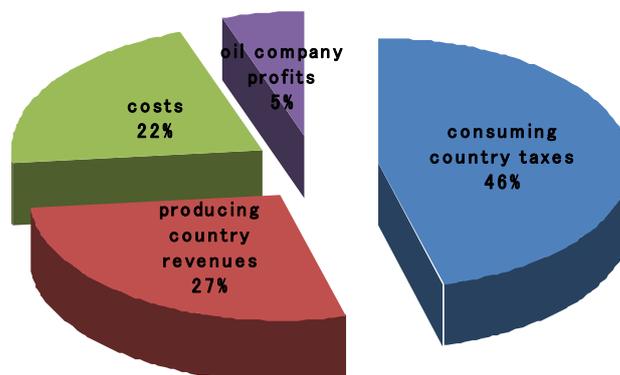
Figure 1: OPEC Revenue (1978-2007)



¹ Readers are advised to refer to the Energy Charter Secretariat’s study “Putting a price on energy” (2007), Chapter 2 “Explaining Oil and Gas Pricing Mechanism: Theoretical and historical aspects”. Basic concepts of rent are discussed there.

² Aoun, The Oil Rent and the Economic Development of Exporting Countries (University Paris-Dauphine, 2008)

Figure 2: The World Oil Surplus (2004)



Source: Aoun (University Paris Dauphine)

1.2. Upstream Legal Concept

Upstream taxation is closely related to upstream investment frameworks. Over the 150 years of modern oil industry history, a number of investment frameworks and taxation regimes have evolved. They are: concessions, leases, licences, production sharing agreements, service contracts and others on the one hand; and royalties, petroleum revenue taxes, severance taxes, cost oil / profit oil and others on the other. Investment frameworks for natural resources such as oil and gas have quite different legal attributes from others. They also change depending on the country and the time period the investment framework belongs to. Before discussing oil and gas upstream taxation, one needs to understand some legal features.

Rule of Capture

There are three types of goods relevant to natural resources in economics – private goods, public goods³ and common goods. In the US where the modern oil industry started 150 years ago, natural resources such as oil, natural gas, or water which migrate from one place to another are regarded as “common goods”. Common goods are best described as goods that are shared and benefited by all the members of a community.

Ownership of common goods is obtained by the first person to exploit or “capture” them (“rule of capture”). When a landowner drills a well and extracts (or captures) oil, he will acquire the ownership of the oil under the rule of capture, regardless of the rights and interests underground.

When these resources are captured, they are assigned a unit of measurement, such as one barrel of oil, or two thousand cubic feet of natural gas, which can be owned, used and transferred. In other words, they become private goods. Private goods fit the normal concept

³ ‘Public goods’ includes air, sunlight, wind and others. One cannot exclude another person from using these resources. No one can capture the sun or have control over the wind, although energy can be obtained from these resources. The rights on air, sunlight and wind cannot be defined completely, and it is impossible to transfer the wind from one person to another (although one can sell electricity generated by the wind). Public goods are also undervalued and over-consumed as they do not cost anything.

of “goods” – the property rights of private goods are completely defined, the property owners have an exclusive right, and the properties can be transferred from one owner to another.

This however, led to overproduction, waste and pollution in the early days of the US oil industry. Once oil was found, landowners competed fiercely with each other to drill wells in the immediate vicinity to try to bring oil to the surface prior to their competitors. This was a classic example of "tragedy of the commons". In the early 20th century the Texas Railroad Commission was given the authority to regulate the oil industry, explicitly as a means to preventing overproduction and waste from taking place.

Sovereignty over Energy Resources

Posited conceptually opposite to the rule of capture under common law is the sovereignty over natural resources, which slowly took shape between the 1910s and the 1960s. The central tenet of this ideology is that all natural resources within the border belong to the sovereign state. The first prominent cases were found in Mexico and Russia. During the Russian revolution of 1917, oil fields, which were located in the Baku area and owned by the Novels, the Rothschilds and others, were nationalised and placed under state control. The Mexican constitution of the same year stipulated in Article 27 that “All natural resources in national territory are property of the nation”. However, it took some 20 years to nationalise oil assets owned by foreign oil companies in Mexico. Upon the completion of this process, national oil company PEMEX was created in 1938, and has been the sole operator in the country’s oil industry ever since.

Even in such common law countries as the UK and the US, a leasing or licensing system was started in the 1930s as the oil and gas exploration / exploitation front moved to remote areas (and later to offshore and the polar regions) which are not inhabited by human population but owned by the government. Under the leasing system the government manages and regulates the development and exploitation of natural resources by leasing certain acreages for a limited time while obliging the lessees to pay rents and royalties in return.

A resolution adopted by the UN General Assembly in 1962 completed the process of transforming the concept of sovereignty over natural resources from a political claim to a principle within international law. It declared that “The right of peoples and nations to permanent sovereignty over their natural wealth and resources must be exercised in the interest of their national development and of the well-being of the people of the State concerned” (see Appendix C).

Article 18 (4) deals with the principle of non-discrimination in access to energy resources. It is important for foreign investors that they compete with domestic companies on an equal legal footing when applying for a permit. Article 18 (4) pursues this objective by stipulating that the member governments shall facilitate access, *inter alia*, by allocating such authorisations, licenses, concessions and contracts in a non-discriminatory manner on the basis of the published criteria.

Box 1: Sovereignty over Energy Resources

The Energy Charter Treaty adapted the spirit of the UN Resolution No. 1803 (XVII) (1962) “Permanent Sovereignty over Natural Resources” in Article 18 “Sovereignty over Energy Resources” (see Appendix D). Article 18 (1) confirms the principle of state sovereignty and rights over energy resources. It adds that these sovereignty rights must be exercised in accordance with the international law. Pursuant to Article 18 (2), the member governments retain their sovereign rights to determine the system of property ownership of energy resources.

Article 18 (3) contains an illustrative list of sovereign rights that are not affected by the Treaty. It includes the rights to determine:

- The areas made for exploration and development
- The optimum recovery and exploitation rates
- Taxes, royalties and financial payments
- Environmental and safety regulations
- Government or state enterprise participation

2 INVESTMENT FRAMEWORK AND TAXATION

2.1 Taxation in the US in the Early Days

In the US in the 18th and 19th centuries, settlers to western public lands could pre-empt the right on land. The Homestead Act of 1862 gave applicants an entitlement to 160 acres of undeveloped land outside of the original 13 colonies. Railroads were given adjacent public lands to their railroad lines, as they played an important role to assist the movement of people westward and shipment of resources eastward. These entitlements to lands included minerals underground. When the modern oil industry started in the mid-19th century, the land was already populated and private property was established in Pennsylvania. Therefore, oil drilling and production were based on leases. Edwin Drake's first successful oil well was drilled on a leased land in 1859.

The majority of global oil production was located in Pennsylvania in the late 19th century. The industry was characterised by inexpensive drilling and targeting shallow formations on relatively small segments of land. Around the turn of the century however, the market grew larger, reservoirs became deeper and drilling more costly. With the discovery of Spindletop in East Texas in 1901, the industry nucleus moved to Texas and Louisiana. Large companies were entering the business and started developing larger oil reserves. They concluded lease agreements with farm and ranch owners to drill wells. Under a typical lease agreement, the lessee paid to the lessor an annual rent to maintain the lease, and if and when production was obtained, a percentage of the production as "royalty". The percentage varied from one lease to another. Many of these lease agreements were fixed-term (some were for as long as 99 years) but some were of no-term which could potentially last forever.

The federal, state and municipal governments started imposing royalties on oil extraction at the beginning of the 20th century within this context of the industry's development. Royalty can be thought of as a right or prerogative of the state to receive a percentage of the proceeds from mines in the country. The concept of royalty predates personal income taxes and corporate income taxes. It is not particularly difficult to imagine that the people who drilled wells in East Texas at the beginning of the 20th century were not the kind of people who would file accurate income tax returns. Royalties are imposed not only on the producers but also on the landowners who received "royalty" from the producers under the lease agreements. They are imposed on the production (or the revenues), regardless of the profits.

While royalties are a historically important instrument for oil and gas taxation, they can deter operation and investment if the rates are too high. Taxing profits (i.e. rents) remains a better form of taxation because it does not distort these economic decisions. Subsequently, corporate taxes were introduced as a means to tax profits from oil and gas production, or in other words, to allocate rents between the government and the investor. Many governments chose to use the corporate tax for the practical reason of implementation. At the time, a legal framework and reliable administrative procedures for corporate tax had already been established.

2.2 Taxation under Concession

Outside the US, the Nobels and the Rothschilds began their oil ventures in Baku and the Caspian / Black Sea area in the 1870s and 1880s, while Royal Dutch started producing oil in Sumatra in the 1890s. Oil was discovered in the Middle East in the early 20th century by foreign oil companies. These foreign investors operated under the concessions system. The

concessions in this period granted exclusive rights to explore and exploit oil over wide areas for long-term periods to foreign companies. In some cases, foreign oil companies were given governmental authorities in the concession area of the host countries. In return, host countries received rents, royalties, taxes, or fees in the form of cash or gold.

In Venezuela, oil was known and used on the shores of Lake Maracaibo at the colonial time. The first concession for oil exploration was granted in 1865 but the country's mineral law which gave a legal ground to oil concessions was promulgated only in 1905. This law permitted transfer of concessions and oil exploitation rights for a 50-year term and a royalty of two Venezuelan Bolívares per hectare of the concession land. In 1914, Royal Dutch Shell successfully drilled a well on the Mene Grande oil field on Lake Maracaibo. This was the first Venezuelan oil field of international significance. In 1920, the Hydrocarbon Law was enacted, which stipulated a minimum royalty of 15%. The law also established the concept of national reserves that, once the initial period for exploration was over, half of the production would belong to the nation. However, in 1921-1922 foreign oil companies and their political allies were able to reverse fiscal conditions and reduce taxes and royalties. Venezuela had to wait until 1948 to realise the 50%-50% fiscal condition.

The first Middle Eastern concession was negotiated by an Englishman, William Knox D'Arcy. In 1901 the Shah of Persia, Mozzafar-al-Din, granted him a concession for a 16% royalty (plus a \$100,000 bonus and another \$100,000 of stocks of his oil company). D'Arcy in return received an exclusive right for oil over 500,000 square miles of Persia for the next sixty years. He subsequently discovered an oil field at Masjid Soleiman in the south-western part of Persia, and production was started in 1914. D'Arcy's concession was succeeded by the Anglo-Persian Oil Company (which later became BP).

In 1933, the founder of Saudi Arabia, King Abdul Aziz Ibn Saud, had a concession agreement with the Standard Oil Company of California (later to become Chevron) for 50,000 pounds with a flat-rate royalty of four gold shillings per ton of oil production. These fiscal terms were even less favourable to the host country than D'Arcy's concession. The Saudi Arabian concession lasted 66 years and covered some 300,000 square miles. Having no success in finding oil, Texas Oil Company (later called Texaco, which merged with Chevron in 2001) joined the concession as a 50% partner in 1936. Finally in 1938, the first success came on a drilling in Dammam, north of Dhahran. Fiscal terms of other concessions in the Middle East followed this Saudi Arabian model.

In Indonesia at the beginning of the 20th century, Royal Dutch Shell had most of the oil production and facilities under Dutch colonial power. However, Standard Oil of New Jersey (later to become Mobil and to be merged by Exxon in 1999) entered into North Sumatra in 1912 and Standard Oil of California into Central Sumatra in 1931 (Texas Oil Company formed a joint venture, Caltex, a few years later). Two giant fields (Duri and Minas) were found in the Central Sumatra acreage in the 1940s. The two fields still supply half of the Indonesian oil production today. Concessions were awarded to these companies under a Dutch-style mining law. The duration of concessions were long – 75 years, and the concessionaries were required to pay a 4% export duty, a 20% tax on oil profits and a general 20% corporate tax.

Concessions are now criticised as too favourable to the foreign oil companies. Fiscal terms of most concessions followed those in the US in the 19th century. Unlike licenses and production sharing agreements which came later, there were no drilling obligations under concessions.

Nor did the host country have the right to participate in the project or have a say on exploration drilling or field development. Furthermore, companies operating under concessions were often exempted from tax obligations other than those agreed upon in the concessions.

2.3 Taxation under Lease

2.3.1 US

Royalty

As described in the previous section, the nature of common goods and the rule of capture in common law were reflected in the concept on the ownership of oil and natural gas resources in the 19th century. The General Mining Law of 1872 permitted patenting of natural resources on federal land. The landowner or a person / company who obtained the right by way of a *private* lease drilled a well and started production then. However, concerns over resource exhaustion and environmental damages led the government to change the system in the early 20th century.

A new *federal* mineral management system was created under the Mineral Leasing Act of 1920, which the current mineral leasing system in the US is based on. The law reserves the existing rights on minerals on federal land to the US Federal government. The minerals subject to the lease system cover oil, natural gas, coal and oil shale. The US federal government currently owns about a third of the country's onshore land. Now a lessee obtains the right to explore and mine a mineral when a lease on the mineral is granted by the government. The lessee in return, is obliged to pay bonuses, annual rentals and royalties⁴ and to comply with all the terms and conditions of the lease as well as relevant laws and regulations.

In addition, the country's sovereignty extends to the outer continental shelf (known as OCS lands). Under the Outer Continental Shelf Lands Act of 1953 the US federal government controls and manages natural resources on the outer continental shelf beyond three miles from the coast line (called OCS leases). Meanwhile, the states have jurisdiction over submerged lands and inland waters within three miles of the coast.

Under the leasing system the US federal government obtains revenues from the extraction of its minerals in the form of royalties, annual rentals, and bonus payments. Both the Mineral Leasing Act and the Outer Continental Shelf Lands Act require lessees to pay to the federal government a percentage of the volume or value of the oil and gas production as royalty.

The Mineral Mining Service (MMS), a bureau within the US Department of Interior, was created under the Federal Oil and Gas Royalty Management Act of 1982, to manage OCS leases and revenues from them. In recent years, some \$6 billion are collected annually from the federal onshore and offshore mineral leases and \$4.3 billion of the 6 billion come from

⁴ Generally, the tax the states impose on oil production within their territory is called the severance tax, while the one the federal government imposes on its lease is called royalty. Both of them are typically a percentage of the sales price of oil.

royalties, rents and bonuses of OCS leases⁵. These are one of the federal government's largest sources of non-tax revenue.

Since the laws provide the federal government with an option to receive royalty payments in kind or in value, the MMS started taking oil and gas royalties in kind in 1998. Gas royalties in kind are sold by the MMS through a competitive bidding system, while oil royalties are either sold in the same way as gas or used to fill the US Strategic Petroleum Reserves (SPR). Between 2002 and 2005, approximately 112 million barrels of oil royalty in kind were supplied to the SPR. A new round of the SPR fill programme, which started in March 2007, will add some 27 million more barrels for an 18-month period.

Figure 3: US Oil Production and Consumption

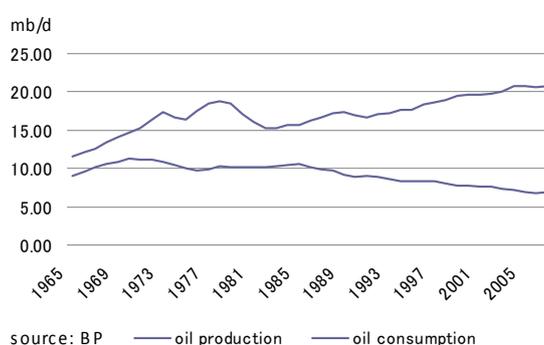
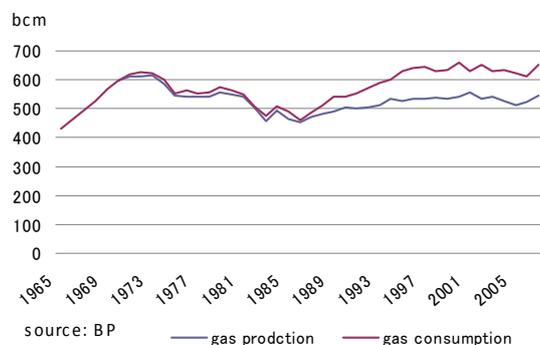


Figure 4: US Gas Production and Consumption



Corporate Income Tax

In addition to royalties, oil companies pay federal and state corporate income taxes as well as franchise taxes, payroll taxes, property taxes and withholding tax. The US corporate income tax rate has gone through a few changes since the 1980s. The top corporate income tax was lowered from 46% to 34% in the Tax Reform Act of 1986 under the Reagan administration. However, the Omnibus Budget Reconciliation Act of 1993 signed by President Clinton added a new top rate of 35%. While the statutory tax rates have remained unchanged to date, the American Jobs Creation Act of 2004 enacted a phased-in deduction that effectively lowered the top corporate income tax rate to 34% in 2005 and 2006, and to 33% for the next three

⁵ Facts and Figures 2003, Mineral Management Service, US Department of Interior

years, and finally to 32% after 2009. State corporate income tax, the rate of which varies state by state, comes on top of the federal corporate income tax.

According to the Tax Foundation in Washington DC, the average effective tax rate on the major integrated oil and gas industry was 38.3% in 2005, which was higher than the average effective tax rate of 32.3% for the country as a whole⁶. At the same time, oil companies are seen as the main benefactors of foreign tax credits and the last-in-first-out (LIFO) accounting methods.

There are energy-related tax credits under the Energy policy Act of 2005, to promote energy efficiency and clean energy production. Businesses are eligible for tax credits for buying hybrid vehicles, building energy-efficient buildings, and improving the energy efficiency of commercial buildings. Small producers of biodiesel and bioethanol also receive tax credits.

2.3.2 UK

Licensing

The UK's first offshore licensing round was held in 1964, while onshore petroleum licensing started earlier in the 1930s. The first oil field in the North Sea, "Forties", was discovered in 1970. Forties was followed by Brent, Ninian and other fields in the 1970s. Subsequently in 1981 the UK became a net exporter of oil. However, the UK's oil output peaked in 1999 and the natural gas production in 2000. They have been in decline ever since then and as a result, the UK became a net importer of oil again in 2006 and of gas in 2004.

The UK licensing system was started under the Petroleum Act 1934⁷. The law vests all the rights to petroleum in the Crown and, at the same time, permits the government to grant licences to search for and bore for and get petroleum. Licences confer these rights over a limited area and for a limited period. Most of them follow a standard format in terms of annual rentals, terms (periods) and relinquishments of the acreage. In addition, the detailed regulatory terms and conditions that the licensees have to observe (called "model clauses") are attached to the licences.

There are two types of licences in *offshore* licensing – production and exploration licences. The main type is production licence. Most licenses issued thus far are production licenses. The coverage of production licences extends beyond production to the full life of a field from exploration to decommissioning. A production license is typically a couple of hundred square kilometres in area. Meanwhile, exploration licences are issued to companies carrying out exploratory surveys over wide areas in the offshore sector. Exploration licenses do not have exclusive rights and, when the holder of an exploration licence wants to explore acreage covered by a production licence, an agreement is needed from the production license holder.

Within the production licence, there are three types: "traditional", "frontier" and "promote" licenses. "Traditional" production licenses make up the bulk of the existing production licenses, while "frontier" production licences are issued to carry long-term appraisal and development operations under challenging conditions. "Promote" production licenses were

⁶ Large Oil Industry Tax Payments Undercut Case for "Windfall Profits" Tax by Scott A. Hodge and Jonathan Williams, Tax Foundation (2006)

⁷ The Continental Shelf Act 1964 extended the licensing powers of the Petroleum Act 1934 to the UK Continental Shelf and the Petroleum Act 1934 was later amended to the 1998 Act.

introduced in 2002 as part of “Promote UK” to stimulate investment onto the UK continental shelf. The promote licence allows the entry of the companies that would not be able to compete in “traditional” production licensing rounds. Under the promote licence these companies will have up to two years before they meet the financial, technical and environmental standards. Drilling is not allowed under the promote production licensees.

Figure 5: UK Oil Production and Consumption

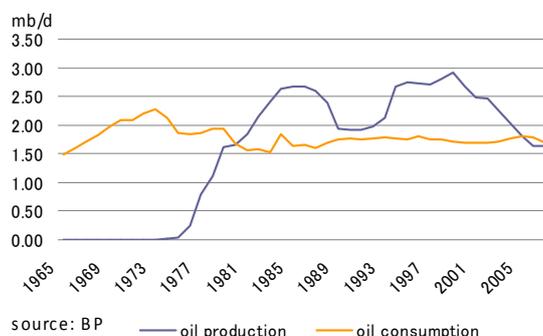
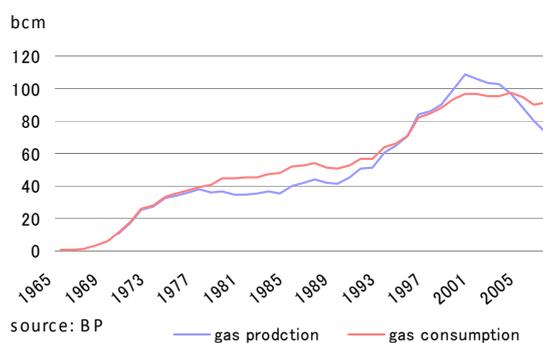


Figure 6: UK Gas Production and Consumption



Taxation

The tax regime applied to companies engaged in oil and gas extraction activities in the UK and on the UK continental shelf consists of three layers of taxes: corporation tax, supplementary charge and petroleum revenue tax (PRT). These taxes are levied on profits. Royalty used to be imposed on the gross value of oil and gas production (less an allowance for certain costs) at the rate of 12.5% but was abolished in 2003.

The standard corporation tax applies to all companies, with the addition of the ring fence. The ring fence is a scheme adopted by many countries in their upstream taxation. While the standard corporation tax is applied to the consolidated operations of a corporation, the ring fence separates profits of oil and gas production from losses in other business of the corporation. Profits in the ring fence cannot be offset against losses outside the ring fence. The ring fence draws a line between oil fields in some countries and in other cases it separates oil production from the other segments of the industry, such as refining or marketing. In the UK, profits from oil and gas production in the mainland and the continental shelf cannot be reduced by losses from the other activities of the corporation or by excessive interest payments. The corporate tax rate is currently set at 30%.

A supplemental charge was introduced in 2002 to impose an additional charge of 20% (10% before 2006). The taxable profit base is nearly the same as the corporate tax but with no allowance for any financing costs.

PRT is a tax designed specifically to collect a high proportion of total economic rent from oil and gas fields in the UK. PRT is a field-based tax – the costs of developing and operating a field can only be set against the profits from the field. PRT is charged at the rate of 50% and deductible as an expense against corporation tax and supplementary charge. Since 1993 the PRT has applied only to the fields that were developed prior to 1993. At the same time the tax rate was also reduced from 75% to 50%. PRT accounted for £1.9 billion (or 0.4% of the total tax revenue) in the UK’s government revenue forecasts for 2006-2007.

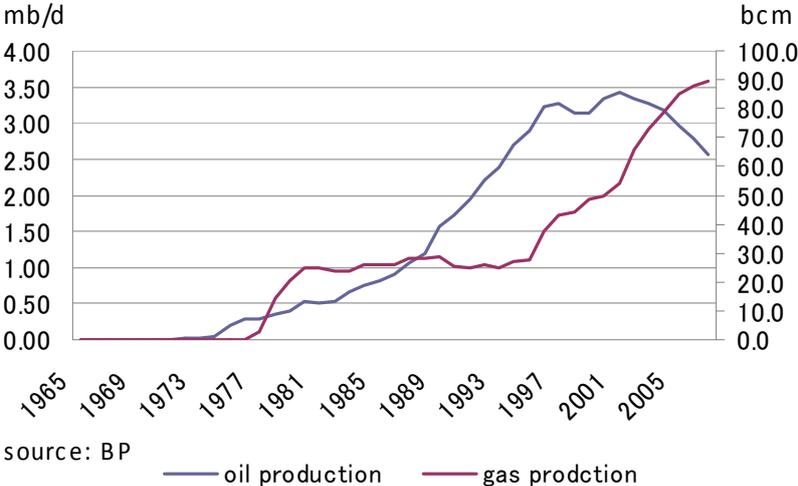
2.3.3 Norway

Licensing

Norway produced 2.56 million barrels per day of oil and 8.7 billion cubic feet per day (89.7 billion cubic metres) of natural gas in 2007, making it the seventh largest oil producer and the fifth in natural gas. Norway’s oil and gas industry began with the discovery of the Ekofisk field in 1969. Today, there are 57 producing fields on the Norwegian continental shelf. The oil and gas sector accounted for 24% of the GDP in 2007 and 48% of the country’s exports in terms of value. It also contributed to 31% of the government revenues. While Norwegian gas production continues to grow, oil output peaked at 3.42 million barrels per day in 2001 and has been declining ever since.

The Petroleum Act of 1963 established the rights to petroleum deposits on the Norwegian continental shelf are vested in the state. This law and related regulations, authorises awarding licences (called production licences) which provide an exclusive right for exploration, exploration drilling and the production of petroleum within a particular geographical area. The ownership of produced petroleum rests with the licensees. A production licence has an initial exploration period, which can last up to ten years. A specified work obligation has to be met during this period, including geological / geophysical surveys and / or exploration drilling.

Figure 7: Norwegian Oil and Gas Production



Production licences are normally awarded through licensing rounds. The negotiation process in the Norwegian licensing rounds is quite unique. Once applications are made, the government puts together a group of companies for each licence or makes adjustments to a group of companies which submitted a joint application. The operator responsible for the day-to-day operation of a license is also appointed by the government.

Taxation

The Norwegian government receives a share of the economic rent of oil and gas production by way of (i) taxes on oil and gas income, (ii) charges and fees, (iii) direct ownership in the oil and gas fields through the State Direct Financial Interest (SDFI), and (iv) dividends from StatoilHydro.

Box 2: Calculation of Norwegian petroleum tax

Operating income (Norm Price)

- Operating expenses
- Linear depreciation for investments (6 years)
- Exploration expenses
- CO₂-tax and area fee
- Net financial costs (limited by the thin capitalisation rule: 20% equity)
 - = Corporation tax base (tax rate: 28%)
- Uplift (7.5% of investment for 4 years)
 - = Special tax base (tax rate: 50%)

(Source: Norwegian Ministry of Petroleum and Energy)

The standard corporation tax (28%) and an additional special tax (50%) are imposed on oil and gas income. Contrary to the UK there is no ring fence between fields. The detailed tax calculation is shown in Box 2. In addition, Norway has a carbon dioxide (CO₂) tax and a nitrogen oxides (NO_x) tax. The CO₂ tax was introduced in 1991 as an instrument to reduce CO₂ emissions from the oil and gas sector. The CO₂ tax is levied at a rate per standard cubic metre of gas burned or directly released, and at a rate of per litre of petroleum burned. Meanwhile, the NO_x tax was introduced in 2007 to fulfil the obligation to reduce NO_x emissions under the Gothenburg Protocol of 1999. Furthermore, an area fee is charged on licenses.

To determine oil income, oil prices are a critical factor. However, it is often difficult for the tax authorities to assess whether prices agreed between two parties are equal to what two independent parties would have agreed upon. Therefore, the Petroleum Tax Act of 1975 and related regulations stipulates how “Norm Prices” are determined for calculation of taxable income. The Norm Prices are set by the Norm Price Board. They are set monthly by field. For natural gas, the sales prices are used as a basis for norm prices.

The Norwegian state, through the SDFI, owns interests in a number of oil and gas fields, pipelines and onshore facilities. The state’s participation interests vary from one field to another. As an interest holder, the state pays its share of investments and costs, and receives a corresponding share of income from the production licence. The SDFI was established in 1985. Before 1985 Statoil, as a fully state-owned company, was responsible for the state’s

ownership holding. When Statoil was privatised and listed on the stock exchange in 2001, the administration of the SDFI portfolio was transferred to a state trust company, Petoro. As of 1 January 2008, the Norwegian state has a 62.5% share in StatoilHydro. The dividends from StatoilHydro also form a part of the government revenues from the oil and gas sector.

Box 3: Taxes and the Energy Charter Treaty

The sovereign countries wish to retain their discretions on tax matters in general, while in an international context tax issues are primarily dealt by bilateral tax treaties. The Energy Charter Treaty confirms these priorities and seeks to avoid potential conflicts with them. Therefore, Article 21 (1) in principle excludes taxation matters from the scope of application. However, there are areas to which the principles of the Treaty apply.

According to Article 21 (2) and (3), the non-discrimination principle in transit and investment applies to taxation measures other than those on income and capital. This means that this principle in general, remains applicable with regard to indirect taxes in these two areas. Nevertheless, there are areas to which the principle of non-discrimination does not apply. They are:

- Advantages accorded by the member government to avoid double taxation
- Any taxation measure aimed at ensuring the effective collection of taxes

Pursuant to Article 21 (4), the Treaty covers taxation matters in trade, with the exception of income or capital taxes.

According to Article 21 (5), the provision on expropriation (Article 13) applies to taxes. A foreign investor may therefore claim that a tax measure has expropriatory effects. However, the investor must first refer the issue to the competent tax authorities. The tax authorities of the two countries concerned shall strive to resolve the issue within six months. If the issue cannot be settled within this period, the foreign investor and / or his home country may invoke the dispute settlement mechanisms under Articles 26 and 27. The tribunal may take into account any conclusions established the tax authorities regarding whether or not the tax amounts to an expropriation.

2.4 Taxation under Production Sharing Agreement

2.4.1 Production Sharing Agreement

The 1960s saw a rise in resource nationalism. Five countries (Iran, Iraq, Kuwait, Saudi Arabia and Venezuela) formed OPEC in 1960, and other oil producing countries joined the organisation during the decade. Against this background, Indonesia started using production sharing agreements (PSAs) in the late 1960s. PSAs quickly became a favoured legal framework among developing countries for their oil and gas exploration and development. Since the 1960s, the PSA has been adopted by countries from Southeast Asia to the Middle East and Africa. In the 1990s even Russia⁸ and the former Soviet republics⁹ introduced PSAs to attract foreign investment. Thus, there are many variations within the category of the PSA.

⁸ See Chapter 7.3.2 Sakhalin II, “Fostering LNG Trade: Role of the Energy Charter” (Energy Charter Secretariat, 2008) for an example of Russian PSAs

⁹ See relevant Country Reviews from the Energy Charter Secretariat

While concessions were thought to give too much profit and control to oil companies over what the host governments considered their sovereignty, PSAs keep ownership of resources and the management capacity of projects in the hand of the state. In comparing PSAs with licenses, licences normally grant a proprietary right while PSAs are basically contractual in nature.

Under PSAs, oil and gas production is shared between the state represented by the state oil company and the operator. Management is in the hand of the state oil company, which approves the operator's budget, work programme, expenditures, procurement and employment, while the operator provides the financing and operation and takes the risks. In return, the operator gets a share of production as compensation to assist the host government in the development of its resources.

Like licenses, PSAs typically stipulate obligatory exploration activities, such as seismic survey or exploration drilling, during the initial exploration period, effectively preventing the operator from "sitting on" the block. The obligations are in most cases specified in the amounts of work and investment. PSAs also have clauses that concessions and licenses do not: domestic supply obligation, state participation, oil pricing, procurement procedure, dispute resolution procedure, and stabilisation of legal and fiscal terms.

Stabilisation clauses were historically associated with the PSA – the operators who previously had stronger positions under the concession system wanted a stabilisation clause in the PSA. Changes in laws and regulations (including taxation) of the host country have significant effects on the terms and conditions of a PSA and the project itself. The stabilisation clause can lock in the legal, fiscal and tax system that exists when the PSA is executed. Stabilisation clauses also vary. Some guarantee that only the laws and regulations in place at the signing of the PSA will be applicable, while others only cover the terms and conditions of the PSA.

Dispute settlement clauses play an essential role when an issue arises which is not addressed or not clearly addressed in the contract. This is particularly so in the case of PSAs, as they are a relatively new legal framework and have been adapted by many countries, giving rise to many variations. Host governments obviously want their laws to govern disputes, while it is critical for IOCs to have an objective and reliable governing law when facing disputes. The compromise was often that host governments allowed "accepted international laws" to supplement their own laws. However, "accepted international laws" are not a firm concept, leaving multiple interpretations. More recently, the International Chamber of Commerce (ICC) and the International Centre for the Settlement of Investment Disputes (ICSID) are often selected as a dispute settlement mechanism.

Under the domestic supply obligation clause, the operator is typically required to supply a part of its "cost oil" and "profit oil" to the domestic market of the host country or sell it to the state oil company on a regular basis or during an emergency. In Indonesia, PSAs require the contractor to sell 25% of the contractor's share oil to the state-owned Pertamina. Sometimes disputes arise from the oil prices supplied under the domestic market obligation clause.

Most PSAs have only limited provisions on natural gas. They are typically focused on basic allocations of "cost gas" and "profit gas" operations regarding associated gas production, sales of natural gas to the host government, and so on. In fact, many natural gas development projects, particularly those for non-associated gas, go through negotiations to set their terms and conditions.

2.4.2 Cost Oil, Profit Oil, Taxes and Oil Pricing

“Cost oil” and “profit oil” are crucial elements of the PSA. The operator recovers its costs from an agreed portion of the production. Recoverable costs (including deductible expenses, depreciations of capital investment, carryovers, etc.) are largely defined in the same way as the costs for tax purposes. Then, the quantity of cost oil is calculated from the recoverable costs and oil prices. After deducting cost oil, the remaining production is profit oil. Profit oil is split between the state and the operator according to the provision in the PSA. The division used to be a simple straight split but that is rare now. At present, it is more common to have sliding-scale allocations based on cumulative production, or production rates, or project’s internal rates of return, or oil price levels. These sliding-scale allocations are normally set in favour of the host governments.

After deducting cost oil and sharing profit oil, a standard corporate tax or a higher special tax of the host government is imposed on the operator. The concept of this taxation is that the operator pays a tax imposed on the profit oil portion, as cost oil under the PSA is calculated in the same way as cost deduction for the tax purposes¹⁰. Tax consolidation is always an issue in oil and gas upstream taxation (see Chapter 2.3.2 UK). In many PSAs, a “ring fence” is drawn along the border of a licence or a block, not allowing the consolidation of losses and profits beyond it. This rule is often applied to both taxes and the calculation of cost oil.

Some PSAs have detailed provisions on taxation, while others do not; simply stating that the tax laws in the host country shall apply. In addition to taxes, the operators may be required to pay royalties in kind or cash. Normally, royalties are taken before cost oil and the rates are typically below 20%. Furthermore, the operator has to pay annual rentals and various bonuses (signing, discovery, production, etc., etc.). Import duties are not imposed on equipment imported by the operator used for the venture. However, all imported equipment will become the property of the state once they land on sovereign territory.

Under the PSA the reference oil price is a key issue. As production is shared in kind, it is necessary to convert the cost recovery in dollar terms to a quantity of cost oil. Needless to say, it is an issue of paramount importance in taxation (also, see Chapter 3 “Double Taxation in the Upstream Sector”). The issue is about what market prices are. PSAs generally contain a provision that market prices are the prices achieved through arms-length transactions between willing sellers and buyers in the international market, or that they are based on the published benchmark prices adjusted by the properties of the crude produced. Crude oil is normally priced on a FOB basis.

It is easy to define oil prices in words but very difficult to practically determine them. Many disputes arise from the determination of oil prices. In the previous section we have seen an example of the authority setting the reference price for tax and other purposes in Norway’s “Norm Price” and “Norm Price Board”. Indonesia has “Indonesian Crude Price” published by Pertamina.

¹⁰ To be exact, cost oil calculations are not the same as tax accounting procedures. Therefore, the taxable income of the operator slightly differs from the profit oil portion. In addition, other factors, such as the cap on cost oil, or various incentive schemes, can cause a diversion.

2.4.3 Indonesia

The PSA is said to be a brainchild of Ibnu Sutowo¹¹, the founder of the Indonesian state oil company “Pertamina”. He borrowed the concept from the sharing of harvest between tenant farmers and landowners, which was a common agricultural practice in Indonesia then. The first PSA was signed in 1961 between Pertamina and a Canadian company, Asamera Oil, for an onshore acreage in North Sumatra, although the one signed in 1967 with an American consortium company, IIAPCO, for a block off the coast of West Java was more prominent.

The Indonesian oil industry was on the rise in the late 1960s and early 1970s. Unified and nationwide, Pertamina was formed out of regional units in 1968. Meanwhile, an exploration boom began in 1967, which resulted in numerous discoveries and the opening up of new oil and gas provinces. Between 1966 and 1976, oil production increased more than threefold from 0.5 million barrels per day to 1.7 million barrels per day. The Duri and Minas fields in central Sumatra were producing nearly 1 million barrels per day at their peak in 1973. Indonesia started exporting LNG in 1977.

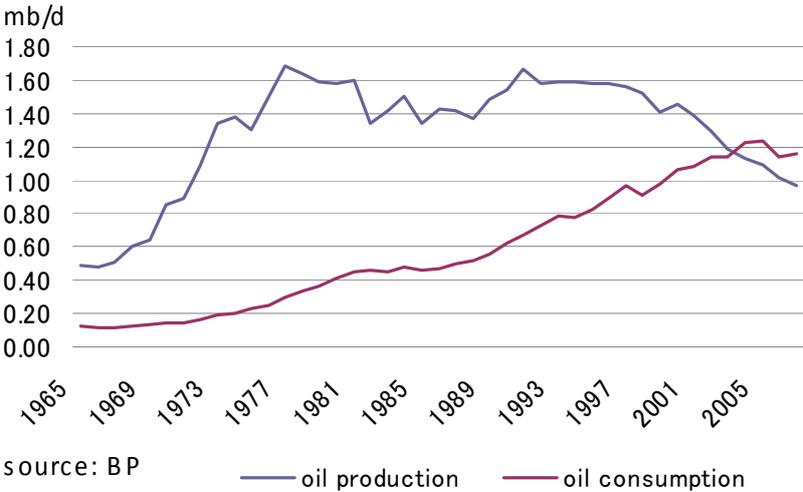
During the above-mentioned period, the PSA was designated as the sole contract form, and served as the basis of the prosperity in the Indonesian oil and gas sector. In the early days, fiscal conditions under the PSA were very favourable to the contractor. The PSAs had a cap on cost recovery at 40% of production, while the profit oil split was 65% for Pertamina and 35% to the operator. The 35% share was the after-tax allocation, as Pertamina paid income taxes on behalf of the operator.

However, the situation was transformed in the mid-1970s. Mismanagement and widespread corruption plunged Pertamina into financial crisis in 1975. In the middle of the oil crises, Pertamina could not repay its debts to the creditors, despite the increases in oil prices. Sutowo was dismissed from the top of Pertamina by the Indonesian president Suharto in 1976. Subsequently, the PSA contract terms were changed. Among the changes, a 56% income tax was imposed on the contractor’s profit oil, and as a result, the after-tax split was changed to 85%-15%. Nonetheless, this clear imposition of an income tax made it easier for US companies to use foreign tax credits in their country.

In the 1980s and 1990s the Indonesian oil industry was stagnant. Upstream investment lagged and production was falling. Small incentive packages were introduced to the PSA on a number of occasions but had little effect on exploration activities. In 2001 Indonesia’s oil sector went through a significant change, with the passage of a new oil and gas law. Under the new law, administrative (sovereign) functions were separated from Pertamina and transferred to the newly created upstream regulatory authority “BP Migas” and its downstream counterpart “BPH Migas”. It is now BP Migas which grants PSAs and manage the operators. Pertamina continued to be state-owned but its monopoly position in the refining and retail sector was abolished. Following the reform, Indonesia became a net importer of oil in 2004 and announced its departure from OPEC in 2008.

¹¹ Sutowo, a medical doctor and an army general, commanded the military operation to nationalise Shell’s oil facilities in North Sumatra in 1957.

Figure 8: Indonesia Oil Production and Consumption



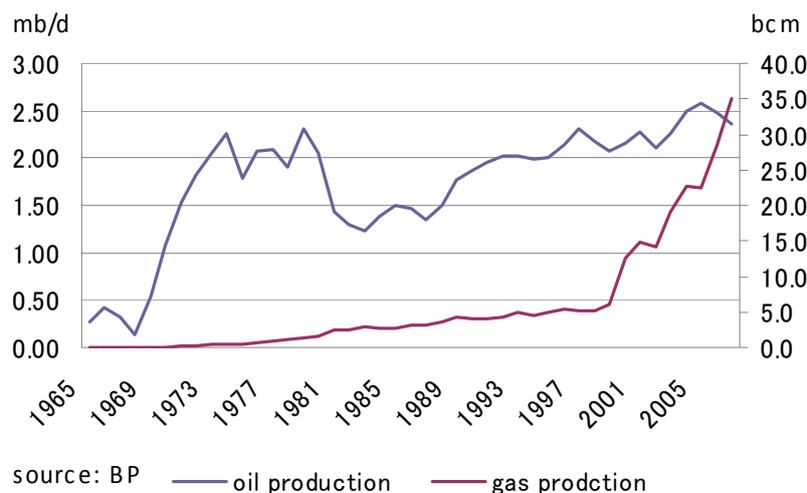
2.4.4 Nigeria

We will look into Nigeria as another example of a country that utilises the PSA regime. Nigeria is an OPEC country, producing 2.14 million barrels of oil in 2007. It is also a large gas producer, exporting natural gas in the form of LNG as well as through the West African gas pipeline to Benin, Togo and Ghana, which recently started operation. Nigeria adopts the PSA primarily for the exploration and development of the frontier areas, while other forms of petroleum contracts (i.e. joint operating agreement and risk service contract) are also used.

The country’s oil production started with Shell’s Oloibiri field in the Niger Delta in 1958. The field was located on a concession in 1937, covering the entire Nigerian mainland for the periods of 40 years for offshore and 30 years for onshore. Pursuant to the Mineral Act of 1914 under the British colonial government, the concessionaries were required to pay annual rents and a royalty of four shillings a ton (2,240 lbs).

In the late 1960s and early 1970s, concessions were converted to “joint ventures” through the joint operating agreement (JOA, also called the participation agreement) under the Petroleum Act of 1969 and the Nigerian National Petroleum Corporation (NNPC) Act of 1973. While JOAs were successful in ensuring state participation in Nigeria’s petroleum sector, NNPC increasingly could not meet the financial obligation derived from participating interests in the joint ventures in the early 1990s. Exploration and production activities were slowed as a result. To revive the activities without increasing financial burdens, the Nigerian government introduced the PSA for deep offshore and inland basin areas.

Figure 9: Nigerian Oil and Gas Production



The PSA was first utilised in Nigeria in 1973, for a contract between the Nigerian National Oil Corporation (established in 1971 and reorganised to NNPC in 1977) and Ashland Oil. However, PSA bidding rounds were held two decades later in 1993 and 2000. Both the 1993 and 2000 PSAs included the royalty, tax, cost oil and profit oil components. Royalty on the deep offshore PSA blocks varies from 0% to 12% depending on water depths, while it is set at 10% for the inland basin PSA blocks. In addition to royalty, a tax is imposed on all the PSA blocks at a rate of 50%. In the 1993 model agreement, 20% of profit oil is allocated to NNPC and 80% to the operator. But NNPC’s share increases to 60% in accordance with the cumulative production. In the 2000 model agreement, the split starts with 30% for NNPC and 70% for the operator, and NNPC’s share goes up to 65% as the cumulative production volume increases.

2.5 Taxation under Service Contract

2.5.1 Risk Service Contract

While the PAS is very popular in various parts of the world, Latin American countries developed an alternative arrangement – the risk service contract. PSAs are described as granting only a contractual right, as opposed to concessions and leases that grant a property right. Like PSAs, risk service contracts are an agreement between an NOC and an IOC. However, risk service contracts strengthened the sovereignty power by not allowing companies to gain any entitlement to oil and gas. In the risk service, contract oil and gas are typically transferred from the NOC to the IOC in the form of sales-purchase relations.

Risk service agreements allow the foreign contractor to explore a specific area in the host country. The contractor pays all the expenses of its exploration operation. If and when a commercial discovery is made and production obtained, the contractor receives payments from the NOC for its services in cash or in kind. In some cases they are entitled to purchase petroleum at a discount price. If there is no discovery or no production, the contractor does not get anything.

The legal concept of risk service agreements is not very different from that of “ordinary” service contracts between an NOC and a seismic survey or drilling company in which the

NOC pays a fee while the contractor performs a certain operation, however, unlike risk service contracts, there is no financial risk on the contractor's part. In fact, Mexico's state-owned PEMEX has a unique form of drilling contract which allows foreign companies to invest in the petroleum sector under the constitutional restrictions. Under several layers of contracts, the contractor essentially drills a well and receives cash and a certain amount of oil.

Latin American countries such as Argentina, Brazil and Colombia, started using risk service contracts in the late-1970s. Colombia titled their contracts as "association contracts", reflecting the fact that they contain more elements from PSAs. The main fiscal conditions of these contracts were as follows:

Table 1: Fiscal Regime of Risk Service Contract in Latin America

	Argentina	Brazil	Colombia
Contract type	risk service contract	risk service contract	association contract
State counterpart	YPF	Petrobras	Ecopetrol
Royalty	12%	No	20%
Corporate tax	No	25%	35%
Bonus	No	Yes	Yes
Other	YPF to participate with a 15%-50% share at the start of production	Petrobras to participate with a 50% share at the start of production	R factor (Ecopetrol's participation according to the project's IRR): 50%-75%
Year abolished	1991	1988	2003

Source: JOGMEC

Until the early 1990s, most oil producing countries in Latin America permitted IOCs to participate through risk service contracts or association contracts. In the late 1990s and early 2000s however, deregulation and privatisation programmes were launched in these countries. To varying degrees, NOCs lost their privileged monopoly status, the state ownership was reduced or sold in its entirety, and administrative functions were transferred to the government agencies. As a result, risk service contracts were abolished and taken over by concessions or PSAs. IOCs were awarded concessions and PSAs by the government agencies. NOCs were now obliged to compete with IOCs on an equal footing.

2.5.2 Buy Back Agreement

Iran's "buy back agreement" is regarded as a variation of the risk service contract. The constitution of the Islamic Republic of Iran in Article 45 vests the disposition of public wealth and property, such as mineral deposits, in the Islamic government, while Article 81 forbids the granting of concessions to foreigners. However, the Iranian Petroleum Law of 1987 allows the ministry of petroleum and the state-owned companies to have contracts with local and foreign natural persons and legal entities. The buy back agreement was developed under the Rafsanjani presidency in the 1990s, as part of the economic reform programme. The first buyback agreement was signed in 1995 (see Appendix F).

"Buy back agreements" are contracts between the National Iranian Oil Company (NIOC) and IOCs as contractor. The agreements typically stipulate the scope of work, which involves a field development. After the contractor commissions the production facility, NIOC takes over operation and in turn, NIOC reimburses costs and an agreed rate of return to the contractor from the field production during the buy-back period (i.e. five to eight years). The costs include interests at LIBOR and the rates of return are said to be around 15%. Taxes imposed on the contractor are reimbursed by NIOC. The contractor does not gain any equity right in oil and gas.

In addition to political uncertainties surrounding the country¹², Iran's buy back agreements have drawn many criticisms. These include:

- The scope of work is inflexible – in particular, the contractor has to bear the cost-overflow with no cost recovery and returns;
- The buy back period is too short, compared to 10 to 20 years in the PSA and lease;
- The contractor has no access to the operation of the field once production starts, which can affect the reimbursement of costs and returns.

Iran reached four new agreements on exploration and development projects in late 2007 and early 2008. One of them is a buy back agreement on the development of the Yadavaran field with Sinopec. The field is located near the Iran-Iraq border, northwest of Bandar Khomeini. The production target is set at 85,000 b/d in the first phase with a 100,000-b/d addition in the second phase. In responding to the earlier criticism, the new agreement has more flexibility in the scope of work. While the investment is tentatively set at \$2 billion, it will be fixed only after the engineering contractor bidding procedure is completed. The rate of return is set at 14.98% while the buy back period is four years.

¹² One day after Iran test-fired missiles in July 2008, Total's Chief Executive Officer, Christophe de Margerie said in an interview with the Financial Times that Total would not invest in Iran because it was too politically risky.

3 DOUBLE TAXATION IN THE UPSTREAM SECTOR

Arguably the most famous double taxation relief case took place in 1951, when Saudi Arabia imposed a new income tax on Aramco (which then was a joint venture between Chevron, Exxon, Mobil and Texaco), replacing the existing royalty and raising the effective tax rate to 50%. Under double taxation rules in the US, the new income tax Aramco paid to Saudi Arabia was immediately deducted from Aramco's corporate income tax in the US. In a sense, the US government protected its alliance with Saudi Arabia at the expense of the tax revenue.

Income from foreign investment is subject to taxation in both the host country and the investor's home country. It is widely perceived that the host country has the first right to tax income generated within its borders. To avoid double taxation, home countries have double taxation relief measures. Depending on the rules, some taxes paid to the host country are deductible from taxable income in the home country while others are creditable to the tax to be paid to the home country.

Income taxes paid to the host country are commonly reduced from the home country's income taxes. The home country has jurisdiction to define what constitute an income tax, and the rule varies by country. Many bilateral tax treaties¹³ stipulate the detailed rules on creditable taxes between the two countries. Normally, no such tax credit is given to royalties, stamp taxes, capital taxes, or customs duties.

We have seen in the previous sections that NOCs often pay the host country's taxes on behalf of the foreign contractors in PSAs and service contracts. Issues can arise in such cases as tax authorities generally need to establish that the tax is the foreign contractor's tax both in form and substance.

Transfer price

A transfer price refers to a price charged in a transaction between two interrelated companies for a product or a service (e.g. a price a parent company charges its wholly-owned subsidiary). Transfer pricing is associated not only with sales of goods but also royalty payments, interest payments, leasing expenses, service fees and others. It can take place in any transaction between two interrelated companies. The reason transfer pricing becomes an issue is that market mechanisms may not apply there.

Income and expenses can be improperly allocated between two interrelated companies by inflating or deflating transfer prices. Abusive transfer pricing can take place among interrelated companies located in the same country or in different countries. Transfer pricing in cross-border transactions can be used to reduce income in a high-tax country (and increase income in a low-tax country or in a tax haven). This is a major issue for tax authorities who are concerned that multi-national companies may set transfer prices to reduce taxable income in their jurisdictions. Transfer pricing regulations and enforcement systems have been established in the last few decades.

Previously, we saw some examples of how oil producing countries set the reference prices for taxation and other purposes. Transfer pricing issues often arise in the oil and gas sector, as oil

¹³ OECD model tax treaty (2003) is available at <http://www.oecd.org/dataoecd/52/34/1914467.pdf>

and gas are traded internationally through sales channels of oil and gas companies involving their subsidiaries in various countries.

One famous transfer price case in the oil and gas sector is called the *Aramco Advantage* case, in which the US Internal Revenue Service (IRS) alleged a tax deficiency of \$6.5 billion during 1979-1981 against Chevron, Exxon, Mobil and Texaco. Saudi Aramco, which was nationalised by the Saudi Arabian government between 1973 and 1980, sold crude oil to these companies at below-market prices and forbade the companies from reselling the crude at market prices. The companies sold the crude to their non-US refining affiliates, which then refined the crude, produced petroleum products and sold them to foreign buyers. Therefore, there were no resulting profits within the reach of US tax authorities. However, the IRS argued that under the applicable transfer-pricing rules it was entitled to increase the prices on the four companies' sales to their foreign affiliates and that the resulting domestic profits were subject to US tax. Chevron and Mobil reportedly settled their disputes out of court, but Exxon and Texaco brought a suit, which was described as "the largest tax case ever". In 1993 the Tax Court rejected the IRS' income reallocation, stating that restrictions from the Saudi Arabian government made the higher transfer price legally unfeasible. While the IRS petitioned the US Supreme Court to hear an appeal, the Court rejected it in 1997.

Another interesting case is the one that involved Chevron, Texaco and Caltex. Before Chevron and Texaco became a merged entity in 2001, the two US oil companies operated separately and each owned 50% of Caltex (see Chapter 2.4.3 Indonesia), which mainly operated in Indonesia. The allegation was made that subsidiaries of Chevron and Texaco in the US had paid Caltex above-market prices for Indonesian crude oil, leading to excessive deductions of costs on the US income tax returns. In early 1991 the IRS began an audit of Chevron's tax returns for 1985-1987. In 1994 Chevron entered into a settlement with the IRS and paid \$675 million for the years 1979 through 1987. This settlement specifically covered Chevron's dividends and oil purchase from Caltex. Although the IRS continued to question other elements of the case after the settlement, the case was finally closed in 1998¹⁴.

¹⁴ Gramlich/ Wheeler, How Chevron, Texaco, and the Indonesian Government Structured Transactions to Avoid Billions in U.S. Income Taxes Contracts (Oil, Gas and Energy Law Intelligence, 2003)

4 RECENT DEVELOPMENTS

4.1 Changing Environment

After the two oil crises prices fell back in the mid-1980s, remaining at around \$20 for the next 20 years (although on a number of occasions, oil prices fell to \$10 and rose to \$40). However, this was a period when the global oil and gas sector changed significantly. If one raises the developments that had impacts upon upstream taxation during this period, they would be (1) liberalisation of petroleum industry, (2) development of markets, and (3) the rise of NOCs.

Industrialised countries deregulated their petroleum industries in the 1980s, and many developing countries followed suit in the 1990s. Import / export restrictions were abolished while government interventions to the industry ended. OPEC-led government sales prices (GSPs) no longer worked in international crude trading, while price controls were lifted in the domestic product markets. Oil prices were set at the markets. In producing countries NOCs, many of which were born out of the nationalised oil assets in the 1970s, gained technology and management skills and were able to start competing with IOCs¹⁵.

Oil prices started rising in 2003 and have been on the rise ever since. Current high prices are supported by layers of factors, such as uncertainties in the Middle East (aftermath of the Iraq War, Israeli-Arab conflicts, the Iranian nuclear issue, terrorism, etc.); tight market fundamentals (rapid demand growth China, India and other developing countries, stagnant non-OPEC production, small OPEC spare capacity, high refinery utilisation rate, etc.); the influx of speculative money in the commodity markets (commodity funds, hedge funds); and the “peak oil theory” (a perception that mankind is finally running out of oil) amongst others.

In summer 2006, oil prices rose to nearly \$80 per barrel. Although oil prices fell back to \$50 in early 2007 they started rising again, and at the beginning of 2008 they passed the \$100 mark before reaching nearly \$150 in the early summer of 2008, coming down to \$110 in August 2008. With these high oil prices and prominent “peak oil theory”, the rent sharing between investors and governments is tilting toward the government side. Fiscal and taxation regimes are getting tighter in the upstream bidding rounds across the board while in some countries changes on the existing contracts are taking place such as in Venezuela.

4.2 Venezuela

Venezuela is one of the oldest oil producing countries who between 1928 and 1970, held the status of being the largest oil exporter in the world. Venezuela has 87 billion barrels of proven oil reserves (including extra-heavy crude oil and bitumen – the seventh largest reserves in the world¹⁶) and currently produces 2.39 mb/d of oil¹⁷. Venezuela is a founding member of OPEC and a significant supplier of oil to the world market.

Venezuela nationalised oil assets held by foreign oil companies under concessions in 1975, from which the state oil company PDVSA was born. However, two decades later in the 1990s, the policy was reversed in what was called “apertura”. Venezuela started inviting

¹⁵ Petroleum Intelligence Weekly ranks the world top oil companies at the end of 2007 as follows: 1. Saudi Aramco (Saudi Arabia); 2. NIOC (Iran); 3. ExxonMobil (US); 4. BP (UK); 5. PDVSA (Venezuela); 6. RD Shell (Netherlands/UK); 7. CNPC (China); 8. ConocoPhillips (France); 9. Chevron (US); 10. Total (France)

¹⁶ Oil and Gas Journal (OGJ) on December 24, 2007

¹⁷ International Energy Agency (IEA), Oil Market Report on July 10, 2008

foreign investment and forming joint ventures with foreign oil companies. Four Orinoco extra-heavy oil projects were formed under the strategic association authorised by the Venezuelan congress, to which reduced tax and royalty rates were applied (see Appendix G). In 1992 Venezuela initiated field rehabilitation projects via the operating service agreement with foreign oil companies. In 1996 a bidding round for exploration blocks was held. Association agreements (also called profit-sharing agreements) were used for the blocks. As PDVSA was internally divided along the line of foreign oil company groups prior to the 1975 nationalisation, PDVSA integrated its subsidiaries, Corpoven, Lagoven (succeeding Exxon's oil assets) and Maraven (based on former RD Shell's assets), in 1998.

Table 2: Fiscal Regime during the Venezuelan Apertura Period

	Exploration Block Bidding Round	Field Rehabilitation Bidding Round
Year	1996	1992
Contract	association agreement (profit sharing agreement)	operating service agreement
Contract term	5-8 years (exploration) 20 years (production)	20 years
Investment obligation	Yes	Yes
Corporate tax	67.7%	34%
Royalty	16.67%	No
Bonus	Yes	No
State participation	1%-35%	No

Source: JOGMEC

After President Chavez came to office at the end of 1998, many changes have taken place in Venezuela. Here, we will concentrate on the upstream fiscal and taxation regime.

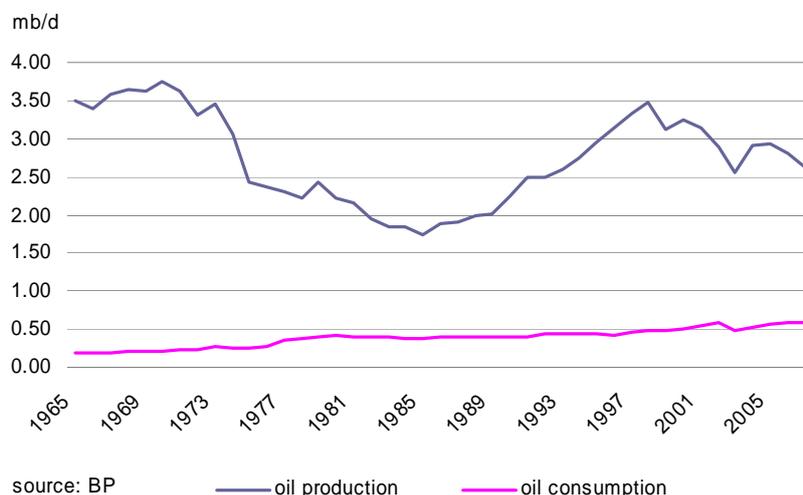
In 2001 royalty rates in the association agreement and strategic associations were increased from 1%-16.67% to 20%-30%. Moreover, all the contracts with private sector companies were converted to joint ventures with PDVSA, with the state oil company taking a majority share.

Nevertheless, President Chavez and PDVSA are not always in unison. Chavez has tightened his grip on the state oil company and the money generated by PDVSA is used in other segments of the country. The management was changed while workers went on strike in 2002-2003. The decline in Venezuelan oil output in recent years is widely blamed for the lack of investment and skilled workers. In 2003, the Venezuelan counterpart in all of the operating agreements, strategic associations and association agreements was changed from PDVSA to the newly established Corporacion Venezolana de Petroleo (CVP).

In 2006, royalty and corporate tax rates were increased to 33.3% and 50% for the four strategic associations, and the Venezuelan government started negotiations on changes in the project structure from strategic association to joint venture (see Appendix G). BP, Chevron, StatoilHydro and Total accepted the Venezuelan demand and reportedly \$1.1 billion were paid to Total and StatoilHydro as compensation for the reduction in their shares. Meanwhile, ConocoPhillips decided to withdraw from Venezuela and negotiations on compensation for the US company are reportedly under way. Conversely, ExxonMobil brought suits to the International Centre for Settlement of Investment Disputes (ICSID) as well as in the UK and the US and it successfully froze PDVSA's assets worth \$315 million in New York in February 2008.

In April 2008 the Venezuelan congress approved the windfall profit tax bill. While the details are not available at the time of writing, the tax will be imposed on oil exports at a rate of 50% when the monthly average of Brent prices is between \$70 and \$100 and 60% when the Brent average is above \$100.

Figure 10: Venezuelan Oil Production and Consumption



4.3 Export Tax

Export duties are another example of government measures to net a larger portion of economic rent within the current high-oil-price environment. In recent years Russia has successfully imposed an export duty on crude oil. The Russian government first introduced an export duty in 1999. The economic rationale for export duties was that Russian domestic oil prices were much lower than international prices and companies made large profits out of international oil deliveries. Through the export duty the government could receive a part of the profits.

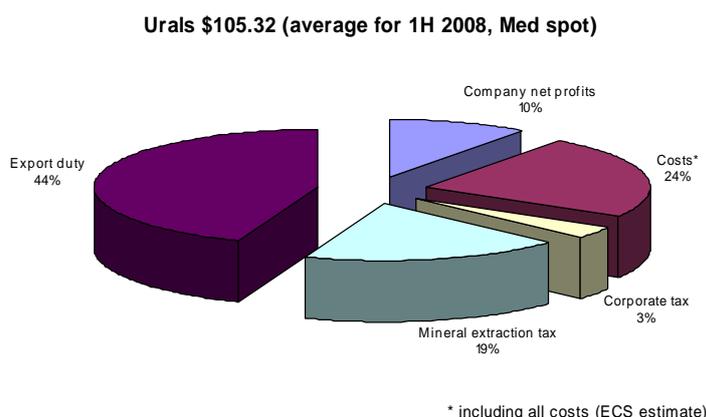
In the 2002 tax reform, the export duty was legislatively tied to oil prices as a percentage share. The Russian government sets the rate bimonthly, based on prices over the previous two months. As oil prices rose from 2003, the sliding-scale export duty has become an effective way of collecting upstream rent from oil companies, and has contributed significantly to the country's overall tax revenue. The latest crude oil export duty imposed from June 2008 is \$46.40 per barrel, based on the average Urals price of \$102.76 for March and April 2008.

According to Sergey Shatalov, deputy finance minister of Russia, natural resources tax accounted for an estimated 16.0% of the total tax revenue in 2005, compared to 20.9% for corporate tax. The natural resources tax revenue includes mineral extraction tax, payments for water and forest use and others, but the bulk comes from the crude oil export duty¹⁸. A portion of revenues from the export duty on crude and products, and a part of mineral extraction tax's (MET's) revenues, go to the Russian government's stabilisation fund established in 2004. The stability fund is managed by the ministry of finance and has a total asset of \$157 billion in 2008¹⁹.

¹⁸ Shatalov, Tax Reform in Russia (International Tax and Investment Centre, 2006)

¹⁹ Bahgat, Oil Funds (OGJ on April 21, 2008)

Figure 11: Rent Distribution-Russian Urals



The Russian government currently has a three-tier tax system, comprising of a corporate tax, a MET, and export duties on crude and products, to receive benefits from the country's oil wealth. Corporate tax is imposed on oil company's profits at a rate of 24%, the same rate as the other industries. MET was introduced in the 2002 tax reform, replacing the levies and taxes that were previously imposed on subsoil asset developers. MET is also linked to oil prices and the rate is \$20.05 per barrel at writing.

While these taxes have been successful in collecting upstream rents, there are concerns over the impact of high taxes on investment and production. Contrary to the steady growths achieved from the mid-1990s until the early 2000s, increases in Russian oil output has slowed in recent years. The current taxes are designed to take more than 90 % of the income earned on the price levels above \$25 per barrel. As shown above, oil company's net profits are estimated at around 10% or \$10 per barrel under the current price levels (\$105.32 for the average for Urals Mediterranean spot prices during the first half of 2008). To reverse the slowing trend and replace reserves, a range of incentives to encourage investment in and production from remote and depleted fields are needed. Reflecting this view, in March 2008 the Russian finance minister Alexei Kudrin announced that MET would be reduced by around 7%, or \$4.2 billion in total, to promote the upstream investment. The reduction will only be applied to oil and not to gas.

Meanwhile, Kazakhstan has started imposing a crude export duty of \$109.90 per tonne of crude oil (around \$15 per barrel) from June 2008. The rate is also set by a formula linked to oil prices and the current rate is based on the first quarter 2008 average price of \$97.53.

Figure 12: Russian Oil Production and Consumption

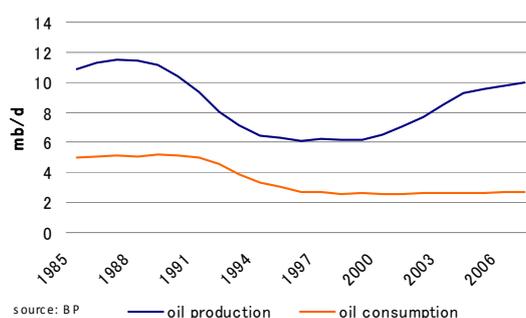
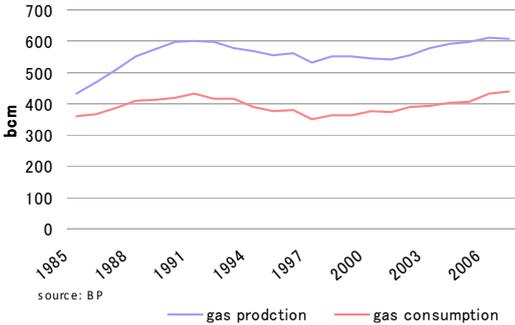


Figure 13: Russian Gas Production and Consumption

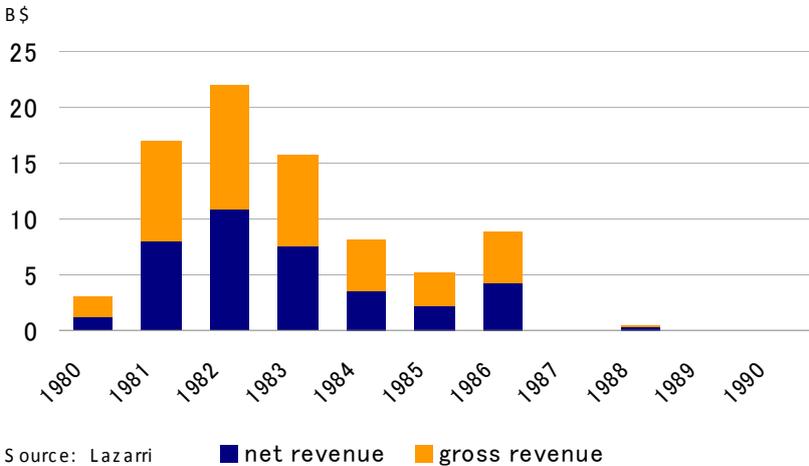


4.4 Windfall Profit Tax

In the wake of high oil prices and the resulting large earnings by oil companies after the oil crises in the 1970s, a windfall profit tax was imposed in the US in the 1980s. The tax was intended to limit windfall profits of the US domestic oil producers against the backdrop of rising international oil prices and the lifting of domestic crude oil price controls. President Carter signed the Crude Oil Windfall Profit Tax Act of 1980 and a windfall profit tax was put into effect during the same year. Despite its name, the tax was not a profit tax, as it was imposed on the difference between the market price and the base price set by the federal government, the average of which was \$12.81 per barrel. The tax rate was 70% but smaller independent producers, stripper-well producers and heavy oil producers were taxed at lower rates. The amounts paid under the windfall profit tax were deductible against corporate income.

According to Lazzari²⁰, the US government collected \$80 billion (gross revenue) through this tax between the fiscal year 1980 and 1990. As the windfall profit tax was deductible as business expenditure, the graph below shows both gross and net revenues. After oil prices collapsed in the mid-1980s there were virtually no windfall profit tax revenues. The Omnibus Trade and Competitiveness Act of 1988 repealed the Crude Oil Windfall Profit Tax Act.

Figure 14: US Windfall Profits Tax Revenue (1980-1990)



²⁰ See Lazzari, The Crude Oil Windfall Profit Tax of the 1980s (Library of Congress [US], 2006)

Meanwhile in the UK, a one-off windfall profit tax was imposed on privatised utilities in 1997. The utility companies affected by the tax include regional water and electricity companies, power generators, British Gas, British Telecommunications, Railtrack and the British Airports Authority. The tax amount was equal to 23% of the difference between “the value of the company in profit making terms” and “the company’s flotation value”. A total of £5.2 billion was collected in two instalments in December 1997 and December 1998 and used to fund welfare and youth employment programmes. The justification for the tax was that investors in the privatised utilities had earned excess profits and that the shares had been under-priced when originally issued. Given these precedents, it is not surprising to see windfall profit taxes being considered and discussed in the UK and the US in light of the current high oil prices and large corporate earnings.

Box 4: EITI in the Oil and Gas Sector

The Extractive Industries Transparency Initiative (EITI) started with a proposal by the then British Prime Minister Tony Blair at the World Summit for Sustainable Development in Johannesburg in 2002. The EITI seeks to improve transparency and minimise corruptions by requiring that government revenues from the extractive industries – such as tax, profit oil and royalties – be published in independently verified reports. In these reports the government revenues are compared with payments made by the companies.

Both the governments and industries benefit from participation in the EITI. By implementing the EITI, governments can build governance capacity, improve international credibility, affirm that they are committed to fighting corruption, and enhance investment climate. Meanwhile, industries can enjoy transparency and good governance in the sector.

As of June 2008, 23 countries have participated in the EITI, including such large oil and gas producers as Equatorial Guinea, Gabon, Ghana and Nigeria. Among the 23 countries there are four Energy Charter constituencies: Azerbaijan, Kazakhstan, Kyrgyzstan and Mongolia. Furthermore, ten countries have published the audited EITI Reports, including the same four Energy Charter member countries. To support the initiative, a total of 37 oil, gas and mining companies have joined the EITI process, through their country operations in the implementing countries, or international-level commitments, or industry associations. Out of the 37 companies ten are from the oil and gas industry, including BG, BP, Chevron, ExxonMobil, Shell, StatoilHydro, Total and others. In 2006, the EITI established its own secretariat in Oslo, Norway.

5 CONCLUSIONS ON UPSTREAM TAXATION

In the previous sections we have briefly looked back at the history of upstream fiscal / taxation regime from the start of the oil industry to the latest issues. In its 150 year history the balance of power has shifted from the investor side to the government side. The principle of sovereignty over natural resources was established in the 1960s and investment framework changed from concessions to leases, PSAs and service contracts. Now the governments of producing countries have more controls, participation and revenues from the development of oil and gas resources.

While oil and gas are taxed heavily along the supply chain, upstream taxation is very different from downstream taxation, in which flat-rate exercise taxes are the main means, and from corporate taxes, the rates of which are lowered in the main industrialised countries to keep multinational corporations within the jurisdiction in what is called “tax competition”. Upstream taxation is all about rent sharing between the government and the investor. Taxes are only a part of the rent sharing regime, which includes fees, rentals, bonuses, government take / participation and other fiscal conditions in addition to taxes.

The rent sharing in oil and gas projects is of paramount significance for both the government and investor. In many developing countries, tax revenues from oil and gas production (or exports) are the main source of the government budget. Meanwhile, investors make decisions whether to invest or not, based on the risks and returns. The rent sharing between the government and the investor is struck according to the balance between prospects for the reserves and production on the one hand and the political and economical risks on the other. There is always competition from similar acreages in other countries. Moreover, political and strategic powers of the investors’ country of origin often have a large influence.

With today’s high oil and gas prices, many producing countries are re-examining the fiscal terms of their upstream projects. The governments are raising taxes, royalties, fees, bonuses and participation by national oil companies, to increase rent. Conversely, some countries with mature producing regions, such as Australia, Indonesia, Norway and the UK, are offering incentives to encourage new investment. Upstream rent sharing requires a careful balance between the government’s desire to maximise revenues, and the incentive to invest in exploration and production.

Despite the fact that oil and gas are both hydrocarbon-based fuels that often exist together, natural gas projects have quite different characteristics from oil projects. While oil is sold on a global market, it is more common for gas to be sold from a specific producer to a specific consumer. Many oil exporting countries try to supply natural gas to the domestic market while keeping oil for exports to the international market. Therefore, gas projects in general enjoy fiscal / tax conditions more favourable to the investor than oil projects do, enabling the development of natural gas resources.

Information on upstream taxation and rent sharing regimes is still hidden under the veil of national and corporate confidentiality in many countries. While it is necessary to protect the negotiation process, the resulting conditions and taxes require transparency for creating reliable tax system, collecting taxes, promoting investment and reducing corruption. Among large oil and gas producers, Australia (although this report does not touch upon the country), Norway, the UK and the US have an information disclosure system on the upstream oil and gas sector. In addition, the transparency appears to be improving in other countries that have

foreign investment projects or joint ventures with foreign partners. From this view point, the Energy Charter Secretariat supports one of the key messages from the International Energy Forum in Rome in April 2008 to increase the transparency in the oil and gas sector.

As pointed out, royalty was the first form of upstream taxation. It was, however, quickly taken over by corporate income taxes which were imposed on profits in the early 20th century, so that taxes did not distort economic decisions. This principle has been largely kept since then, while upstream tax rates and the rent sharing regime have swayed in one way or the other, depending on the situation. Considering these, it is rather that energy prices influence taxation, than the other way round.

6 CATEGORIES OF DOWNSTREAM TAXATION AND THEIR APPLICATION

The Organisation for Economic Co-operation and Development (the OECD) distinguishes six major categories of taxation for which it provides international guideline definitions. These are:

- Taxes on Income, Profits and Capital Gains
- Social Security Contributions
- Taxes on Payroll and Workforce
- Taxes on Property
- Taxes on Goods & Services
- Other Taxes

The taxes on petroleum products and natural gas with which we shall be concerned are all to be found in the fifth category, 'Taxes on Goods & Services', designated category 5000 (OECD 2007, p.289). Within this category, taxes on petroleum products and natural gas are concentrated within two sub-categories: Value Added Taxes (5111) and Excises (5121). They may also appear in the category 'Customs and Import Duties' (5123).

Such taxes on goods and services are often referred to as 'Indirect' taxes. 'Direct' taxes are collected from the people or organisations on whom they are ostensibly imposed e.g. income taxes; in comparison, 'Indirect' taxes are collected from someone other than the person ostensibly responsible for paying the tax. Thus, for example, excise taxes on gasoline are collected from gasoline wholesalers rather than motorists. In practice of course, the tax is passed on to the motorist in the price of gasoline – but with one important caveat. In a competitive market it is possible to demonstrate that an amount less than the full amount of the tax will be passed-on to the consumer and that the seller will have to absorb a part of the tax himself (see Chapter 7). However, in practice the extent to which this is possible depends on the extent to which the 'real world' oil product market diverges from the theoretically 'competitive' model. Because, in reality, 'Direct' and 'Indirect' forms of taxation cannot always be clearly differentiated and the terms may be used somewhat differently in different countries, the OECD does not officially approve of the this terminology. Nevertheless, the distinction has some utility in defining the salient characteristics of the two broad categories of tax. For example, as taxes on expenditure, indirect taxes are often considered to be 'regressive' because the rich person pays the same tax as the poor person in respect of a given level of expenditure – whereas 'direct taxes' on income are 'progressive' because the marginal rate usually increases with income. However, and as we shall see, the reality is more complicated. For example, indirect taxes may also be graduated and in countries with underdeveloped infrastructure for raising direct taxes, indirect taxes are an administratively cheap way of ensuring that the rich at least pay something. At the heart of these issues is the concept of the 'incidence'²¹ of particular taxes – who is actually paying them and how this affects the distribution of income. Looking at incidence in turn involves a distinction between 'nominal' and 'effective' tax rates, but this is more relevant in the context of direct taxes on incomes where individuals and companies have considerable capability to affect the actual tax which they pay.

²¹ 'Incidence': An economic term for the distribution of a tax burden between buyers and sellers.

Two further observations about this class of taxes are worthwhile before we get involved in the detail. Firstly, while prevailing attitudes to both income redistribution and the ‘inefficiency’ of direct taxes (on the grounds of the disincentive effect they may have on the labour supply) might easily lead to the supposition that indirect taxes would be on the rise, this turns out not to be the case, at least in OECD countries. A study of the balance between direct and indirect taxes by the OECD (2007, p. 33) has found that the contribution of the category ‘Taxes on Goods & Services’ to the total taxes revenues of OECD countries has actually fallen slightly, from 34% to 32%, over the past two decades. Moreover, the sub-category ‘Taxes on Specific Goods & Services’, wherein reside downstream taxes on the consumption of petroleum products, has seen a sharper decline in its contribution to fiscal revenues - down from an average of 16.2% in 1985 to 11.3% in 2005. On the other hand, the sub-category ‘Taxes on General Consumption, wherein VAT on petroleum products and natural gas reside, has seen an almost corresponding increase in its contribution, up from 16.4% to an average of 18.9% in 2005 (OECD 2007, Tables 28-31, p.89-90).²²

Secondly, indirect taxation is characterised by wide variety between countries, both in terms of the contributions of different categories of tax to overall tax revenues and in terms of the way in which different taxes are applied. This can be immediately demonstrated with data from the OECD’s study of the balance between direct and indirect taxes: the current 32% average conceals a range of contributions by ‘Taxes on Goods & Services’ to overall tax revenues, from a high of 56.7% in Mexico to a low of 17.4% in the United States (where there is no national VAT, just state-level sales taxes).

6.1 Taxes on General Consumption: Sales Taxes and Value-Added Tax (VAT)

We start with taxes on general consumption because these are taxes on goods and services in general, not just on petroleum products and natural gas. However, this does not mean that such taxes apply to all goods and services in equal measure. Typically, there are both complete exemptions (e.g. on books and baby clothes with respect to VAT) and preferential reduced rates for particular goods and services. With respect to petroleum products and natural gas, the following general possibilities present themselves, recalling that here we are just concerned with general sales taxes, not with special excise taxes:

- That petroleum products and natural gas are both taxed at the same rate as the rate of general consumption tax;
- That they are exempt;
- That they are taxed at the preferential reduced rate;
- That they are taxed at their own preferential reduced rate;
- That each is taxed differently using one of the above methods.

Clearly, the last general possibility implies a dramatic increase in the number of specific possibilities. Moreover, rates change over time as well. Bringing these points to life, China, for example, has specific general sales tax rates for coal and natural gas (13%) compared with oil products (17%) while Italy applies its standard rate, 20%, to both (up from 14% in 1990).

Value-added Tax is a particular kind of tax on general consumption, distinguished by its conceptualisation. Its origins are in dispute: while some claim that a German economist

²² Unfortunately, this source does not calibrate the data in more detail, such that the behaviour of taxes on petroleum products cannot be identified.

thought it up in the 18th century, for the French it was definitely invented by Maurice Lauré in 1954 and introduced in that same year with the name 'TVA'. Its conceptualisation is that only the value-added in the chain of producing, delivering and consuming a good or service should be taxed. Thus, while VAT is charged on so-called 'intermediate' sales (sales to customers who are not the final point of consumption), the intermediate customers involved can claim it back as a refund against the VAT that they themselves have levied on their own customers. The end result of this is that the actual rate of VAT is only charged on 'final' consumption, to the final consumer.

This characteristic of VAT, which is also characteristic of other general sales taxes which do not go by the name of VAT, has an important implication for taxes on natural gas and petroleum products. Because any VAT paid by businesses on either natural gas or petroleum products is refundable, the effective tax for this category of customer is different to that paid by final consumers of the same product. In other words, businesses don't pay VAT on fuels but domestic customers do with the result that this tax may affect the demand from one group of consumers but not from another. If we add this dimension of VAT, and indeed of other general taxes on sales, to a variety of practices which have already been described, it is easily appreciated that just this one tax creates complex challenges for any international efforts at tax harmonisation.

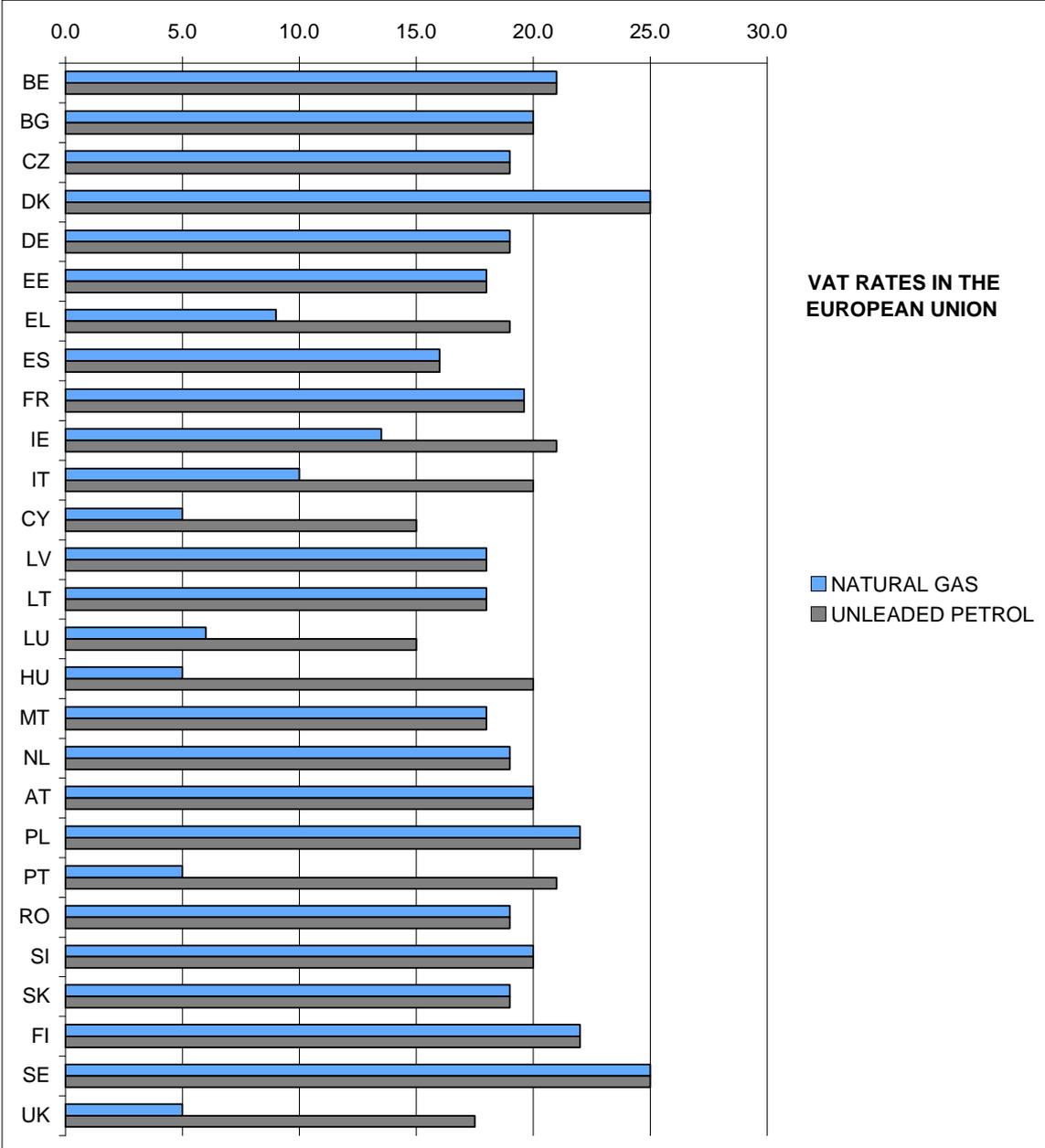
One area of the world where one might assume that such harmonisation would have been achieved is the European Union - but this is very far from being the case. VAT Directive 2006/112/EC of November 2006 conveys the basic rules as 'simple': there should be a standard rate of at least 15% and up to two reduced rates, of not less than 5%, applied to a restricted list of goods and services. But in practice, the European Commission has to admit that, "These simple rules are however complicated by a multitude of derogations granted to certain Member States, in some instances a majority of Member States.....Overall, such derogations prevent a coherent system of VAT rates in the EU from being applied." (European Commission, Taxation and Customs Union). In more trenchant detail, a recent major study of reduced VAT rates in the Community summarises the situation as follows (Copenhagen Economics 2007, p.8):

....the real, actually existing, VAT system within the European Community is far from uniform. Despite the consensus and insight described above, member states apply widely differing VAT rates creating a highly diversified and overwhelmingly complex VAT system. All but a single member state have opted for lower VAT rates on some goods and services and some of those have (implicitly) decided to relinquish tax revenue up to a significant 8 percent of total tax revenue in order meet the 'demand' for lower VAT rates. The standard rate covering about two thirds of total European consumption varies between 15 and 25 percent, while the remaining one third is subject to a vast array of different VAT rates varying between 0 percent and 25 percent. For example, Ireland has defined 2,500 subgroups of goods and services to implement a three-tier VAT system with standard (21.5); reduced (13.5) and zero rates. It even seems as though reduced VAT rates recently are becoming even more fashionable. Thus, no less than 18 member states have recently been allowed by the Council to apply lower VAT rates on very specific labour-intensive sectors of the economy.

It therefore comes as no surprise that Figure 15 reveals major disparities in the rates of VAT applied to natural gas and unleaded gasoline within the European Union. Moreover, while the rates of VAT on unleaded gasoline have a range from 15% to 25% and cluster around 20% (the Standard Deviation is 2.4%), the fact that eight member states of the European Union

apply much lower rates of VAT to natural gas than they do to gasoline, means that the disparity is greater for natural gas (the Standard Deviation is 6.4%).²³

Figure 15: EU VAT Rates on Natural Gas and Unleaded Petrol



Source: European Commission (2008)

Note: France and Latvia apply two rates of VAT to the consumption of natural gas; in the figure we have only used the higher rate. In France the lower rate of 5.5% applies to the fixed charge while the higher rate of 19.6% applies to the consumption of natural gas.

²³ EU member state VAT rates for Diesel, LPG, Heating Oil and Lubricants are largely the same as for Unleaded Gasoline, with the exception of Portugal, which has a dual rate for Diesel which discriminating between industry and agriculture, and the UK which has a much lower 5% rate for Heating Oil.

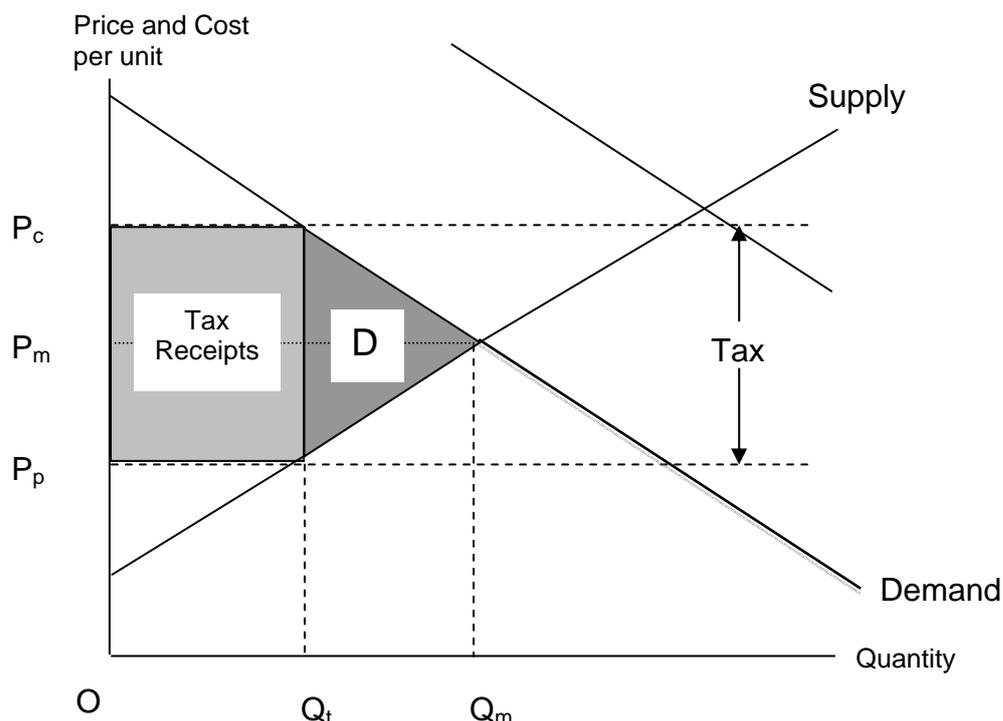
6.2 Special Taxes on Petroleum Products and Natural Gas

Special Taxes on Petroleum Products open up a quite different area of taxation, with different motives, both explicit and implicit, and different methods and concerns. They are also, as we saw above, categorised differently from sales taxes: special taxes on petroleum products are referred to as ‘Excise Duties’. Why this label is used for this particular sort of tax is unclear – in any event the word ‘excise’ is said to derive from the Latin *accensare*, meaning, simply, ‘to tax’. But excises are different from other taxes in the following ways:

- They are applied only to specific goods and services;
- These goods and services are frequently characterised as having a potential for harm (e.g. tobacco, alcohol, gambling);
- In at least one important case (the USA) the income raised by taxation is hypothecated for particular state and government expenditures;
- They are usually levied using an absolute rather than a relative scale. (i.e. they are ‘specific’, not ‘ad valorem’);
- They can often represent a very significant proportion of final prices;
- They are not refundable to intermediate users;
- They may not be collected by the same arm of government as are taxes on income – being grouped with taxes on imports and exports in the domain of ‘Customs and Excise’.

In orthodox (neo-classical) economics the arguments against and in favour of such taxes are developed as follows. With respect to the arguments against, it is assumed that in a market characterised by ‘perfect competition’, there exists an equilibrium price at which the benefit received by consumers from purchasing an incremental unit of a commodity is exactly equal to the cost of producing that incremental unit (the marginal benefit = the marginal cost). If this ‘optimum’ is not achieved – if, for example the cost of producing an incremental amount of the commodity is less than the ‘benefit’ which the consumer would enjoy by purchasing an incremental unit, then the total societal ‘benefit’ could be increased by producing more of the commodity and the situation is ‘sub-optimal’. Secondly, sales taxes (of any kind) are deemed to be intrinsically ‘inefficient’ since they reduce the quantity of a good which is bought and sold below the levels which would otherwise be desired by the contracting parties (the level at which the marginal benefit = the marginal cost). This loss of ‘welfare’ is called the ‘dead-weight loss’ (See Figure 16).

Figure 16: The So-called ‘Deadweight Loss’ Caused by a Tax



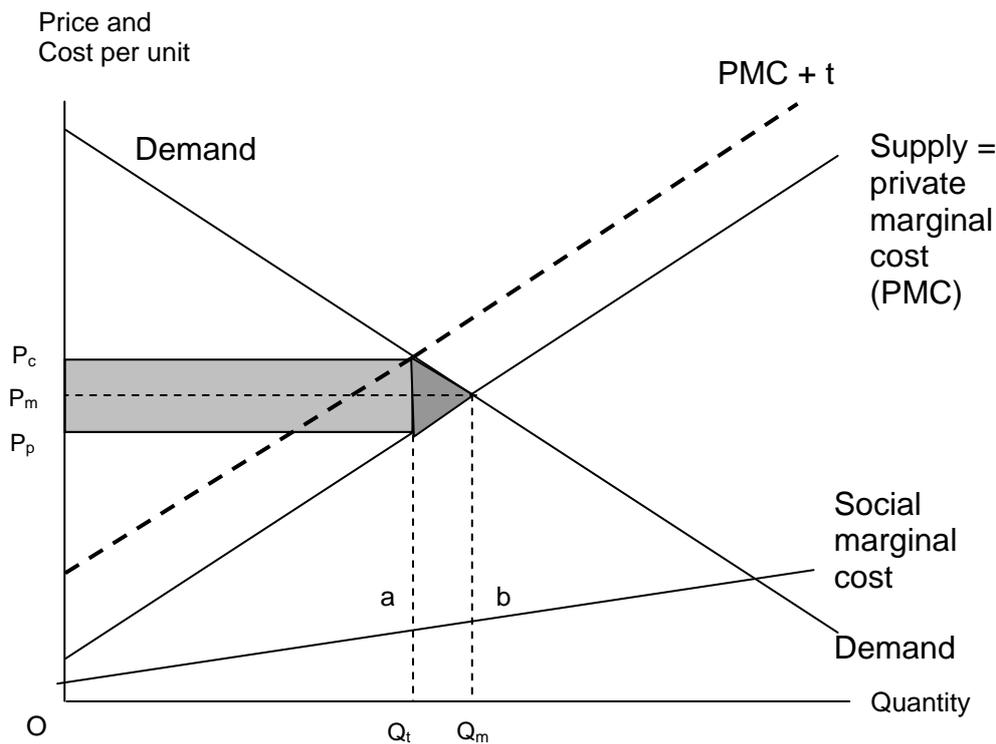
Notes: The downward-sloping demand schedule indicates the quantity of the commodity which consumers might wish to purchase at various (declining) prices. Likewise, the upward-sloping supply schedule indicates the quantity of the commodity which producers / sellers might wish to sell at various (ascending) prices – the assumption being that this line slopes upwards because the cost of producing an incremental amount of the commodity is constantly increasing (known as increasing ‘marginal cost’). P_m and Q_m represent the equilibrium (market) price and quantity in the absence of any sales tax i.e. the amount which consumers and producers would wish to trade in a market without taxes. With the imposition of a sales tax the amount consumers are willing to purchase and producers are willing to sell declines from Q_m to Q_t . The price per unit purchased by the consumer rises from P_m to P_c and the revenue per unit received by the producer falls to P_p . The light grey shaded rectangle represents the value of the Government’s tax receipts and the dark grey shaded triangle marked D represents the ‘Deadweight Loss’, the amount of value which is ‘lost’ by the imposition of the tax. Note also that the post-tax increase in price paid by the consumer for a unit of the commodity is less than the full per-unit tax. The tax burden is shared more or less equally between the consumer and the producer / seller.

However, it was argued by the neo-classical economist A.C.Pigou (1877-1959) that if the production and consumption of a commodity creates social costs which are not accounted for in the market price, then the quantity of output determined by the market alone may no longer be ‘efficient’. In such a case, by charging a sales tax, production and consumption can be reduced to a level which reduces the social cost and the tax-induced loss of output is no longer necessarily ‘inefficient’.

For example, driving a motor vehicle creates what economists call ‘externalities’, which are social costs not reflected in the price which users pay for the good or service in question. Environmental damage caused by vehicle emissions, congestion and damage to roads are examples of externalities which the individual user does not pay for at the point of consumption, and which affects people in general – even those who are not drivers. It is therefore appropriate that drivers pay a tax which is reflective of this cost.

Assuming it is possible to put a monetary value on such social costs the market model would appear as in Figure 17.

Figure 17: A Sales Tax Which Accounts for Social Cost

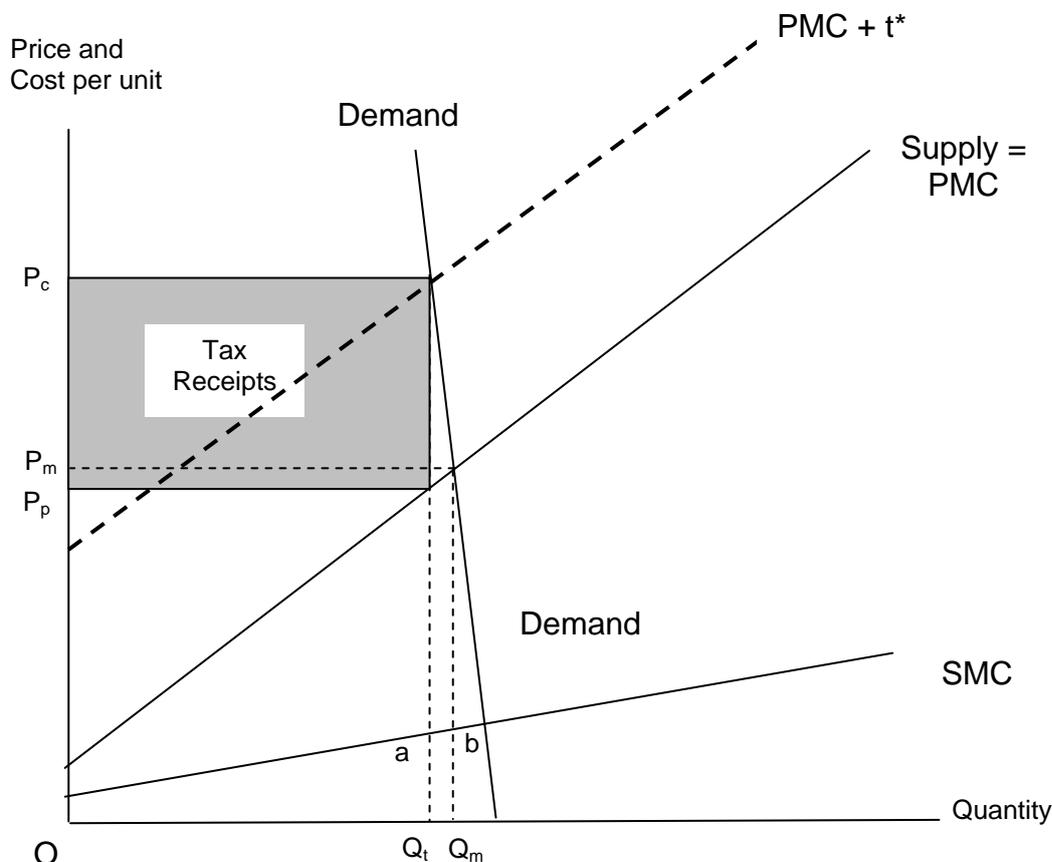


Note: We now assume that the production and sale of the commodity carries with it a social cost and like the private supply schedule it is assumed that the social cost of an incremental unit of the commodity produced and sold also increases. To account for this social cost a specific tax t is added to the market price. This shifts the supply schedule (**PMC**) upward by the value of t . At the new market equilibrium the price per unit paid by the consumer rises from P_m to P_c and the seller's revenue per unit falls to P_p . As in Figure 16, the light-grey shaded rectangle represents the Government's tax receipts and the dark grey shaded triangle represents the 'dead weight loss'. However the reduction in the post-tax quantity bought and sold ($Q_m - Q_t$) results in a reduction in the social cost and the value of this social cost reduction (abQ_mQ_t) is greater than the dead weight loss. As in Figure 16, the tax burden is shared equally between the consumer and the producer / seller. Moreover, if the tax proceeds were hypothecated to adopt measures which would reduce the remaining social cost, theoretically, the social cost could be reduced altogether. In the above model this would be feasible because the value of the tax receipts is somewhat larger than the remaining social cost.

However, even if it is considered possible to put a monetary value on the environmental damage caused by e.g. gasoline consumption by motor vehicles, historically, this has not been the true basis for establishing the levels of gasoline taxes – if it were then we would expect to see similar taxes across the world, which is far from being the case (as we shall see below). This is not to say, however, that the *indirect* consequences of imposing such taxes do not have an unintended consequence in reducing environmental pollution (see Sterner, 2007), although the efficacy of such 'unintended' tax-induced environmental protection is questionable (see Chapter 8).

Returning to our simple theoretical model, it should be clear that the results obtained are almost entirely dependent on the slopes of the demand and supply schedules. For example consider the situation described in Figure 18.

Figure 18: The impact of a steeper (less price responsive) demand schedule and a larger tax increase



Notes: In Figure 18 all the conditions are the same as in Figure 17 except (1) consumer responsiveness to an increase in the price of the commodity is much lower (the demand schedule is much steeper). (2) the tax per unit imposed by the Government t^* is considerably larger than the tax warranted by the social cost. It is easy to see that the following outcomes arise from this configuration: (i) the quantity of the commodity bought and sold after the tax is imposed $Q_m - Q_t$ declines only very slightly; (ii) the reduction in social cost is correspondingly less than in Figure 17; (iii) the amount of tax revenue received by the Government increases substantially; (iv) almost all the burden of the additional taxation is carried by the consumer.

Above, we have referred to the ‘responsiveness’ of consumer demand to a price change. More formally, economists use the measure ‘price elasticity’ (ϵ) which is defined as the percentage change in the quantity of a commodity demanded divided by the percentage change in the commodity’s price. Algebraically this is:

$$\epsilon = - \frac{\Delta Q/Q}{\Delta P/P} = - \frac{P}{Q} \times \frac{\Delta Q}{\Delta P}$$

Elasticity is negative because it is usually assumed that the demand schedule is sloping downwards.²⁴ Price elasticity can also be measured in both the short term (e.g. 1 year) and

²⁴ Because it is convenient to speak of ‘greater’ and ‘lesser’ elasticity and because mathematically, negative values mean that e.g. an elasticity of -0.9 (greater elasticity) is actually a smaller value than - 0.5 (lesser elasticity), it is customary to add a minus sign to the elasticity value to make it a positive number i.e. (-) - (P/Q) x

long term (e.g. 15 years). *A priori* we should expect the latter to be higher than the former given the possibility of improved motor vehicle fuel efficiency, provision of alternative modes of transportation etc. over a longer time period.

In the case of petroleum products there are a vast number of econometric studies estimating the actual value of the price elasticity most of them concentrating on the elasticity of demand for motor gasoline (See e.g., Williams and Mount 1987, Dahl and Sterner 1991a, Dahl and Sterner 1991b, Goodwin 1992, Graham and Glaister 2002).²⁵ The econometric results vary depending on the period studied, the particular economic model employed and whether the study is based on time series data or cross section data (i.e. data for the same period but using a panel of different countries). Nevertheless, there is a general consensus that the price elasticity of motor fuel is very low in both the short and long term. According to the survey by Graham and Glaister (2002), the average values found in a series of studies is as follows (Table 3)

Table 3: Average Values for the Price Elasticity of Gasoline Consumption

	Short Run Price Elasticity	Long Run Price Elasticity
Time series data	- 0.27	- 0.71
Cross section data	- 0.28	- 0.84

Note: See also footnote 24.

In other words, a 10 % increase in the price of gasoline results in only a 2.7 – 2.8% fall in consumption in the short run and even in the long run, a 10 per cent rise in price results in a 7.1 – 8.4%.²⁶ However, it should be noted that a very recent study by Dargay, Gately and Huntington (2007) using a model which allows for an asymmetric response to price increases and price reductions suggests that the long term price elasticity of demand is lower than the figure in Table 3.²⁷

Considering Figure 18 and the data in Table 3, it is clear that sales taxes on petroleum products are primarily about general revenue-raising, and in a very calculated way. The latter is a reference to the fact that the goods and services to which special excise taxes like petroleum taxes are normally applied, as we have seen, exhibit strong price *inelasticity* of demand. In other words they are imposed on these particular goods and services ***precisely because it is anticipated that demand will be little affected by the tax***, and that it will

($\Delta Q/\Delta P$). However, actual practice does vary and in econometric work, where both positive and negative coefficients may appear it is increasingly the practice to simply use the negative and positive signs which emerge from analysis of the data. (See also Table 3 below)

²⁵ The price elasticity of demand for crude oil is discussed in Chapter 8.

²⁶ Of course, this does not mean that an increase in the gasoline price of 10% will actually be followed by a fall in gasoline consumption of 2.7%. This is because so far, we have omitted the other key variable determining demand for gasoline – income level. In fact the income elasticity of demand for gasoline is positive and in most studies has a value of about 1.0. i.e. a 10% increase in GDP/capita is associated with a 10% increase in the demand for gasoline. So the effect of rising GDP/capita strongly outweighs the impact of any fall in price.

²⁷ In this study the long term price elasticity in question is for all oil products other than residual fuel, however a very large component of this ‘other’ category would be transportation fuel (see Dargay, Gately and Huntington p.23)

therefore prove to be a successful way of raising tax revenues.²⁸ Any expression of concern for the environment in imposing these taxes is therefore somewhat hypocritical to say the least. Indeed, a cynic might reasonably conclude that it is in the hope that the social cost of consuming the product will not be reduced too much, that the government imposes such a high sales tax.

These taxes may be extremely useful and reliable sources of revenue for governments; they may also be congruent with objectives such as minimising the balance-of-payment's impact of gasoline / gasoline imports.²⁹ However, they may conflict with other objectives which governments may wish, or be elected, to pursue. Special excise taxes on petroleum products are open to the criticism that they are not compatible with the redistributive role which usually falls to the state. Particularly because special taxes on petroleum products are often 'flat rate' rather than proportional, it is argued that they are also the most regressive form of taxation in terms of their impact on the distribution of income.

However, whether this assumption is correct or not depends on how the taxes are levied, on what stage of development a country has reached and on what is done with the tax revenues raised from the tax. For example, excise taxes could in principle be levied in bands according to income or consumption, and while this may seem difficult to implement, in practice it does happen: the lower tax rating which may apply to diesel fuel for farmers, for example.³⁰ This is implemented by putting a pigment in the diesel and making e.g. 'Red Diesel' only available to farmers (or to the group being targeted for government support). Secondly, in many countries of the world a tax on gasoline is in effect a tax on the richer strata of the population – on those with high enough incomes to be able to afford to buy and run cars. The poor therefore do not pay it, but may receive benefits from the government expenditure which it allows. This in turn raises difficult questions concerning the appropriate differentials between tax on gasoline and taxes on other petroleum products which the poor do use, either directly or indirectly. The tax on diesel affects the bus fares paid by poorer groups in the population, for example. In this context there is also a link between tax on petroleum products, income distribution and the environment. If, for example, a tax is levied on kerosene which is used disproportionately by the poor in rural areas for cooking, heating and lighting then there will be two effects: a regressive impact on income distribution and an adverse environmental impact if poor households substitute scarce fuel wood for kerosene in response to the tax.³¹

Thirdly, the idea that excise taxes on petroleum products may be progressive, because of the uses which are made of the tax revenues to redistribute income, may hold true for taxes in

²⁸ This relationship between price elasticity and taxation was formalised by Wittgenstein's supervisor, the mathematician and economist Frank Ramsey, who suggested in a 1927 paper that the optimal price (and therefore tax) mark-up would be inversely proportional to the price elasticity of demand for a good or service i.e. the lower the elasticity, the higher the tax. The objective is to minimize the 'dead weight loss' as illustrated in Figure 15. However, this 'optimality' is dependent on the absence of social costs (see Figure 17).

²⁹ It may be noted here that the general principal of special excise taxes on petroleum products is that they may take the form of an import tax as long as the country in question does not itself produce the petroleum product in question. If, however, the country produces part of its, e.g. gasoline requirements, then the tax must be a uniformly applied (to imports and home production) in the form of an excise tax on the consumption of the petroleum product in question. Otherwise, if the tax were only applied to the imported component of supply, the country could be open to a charge of protectionism.

³⁰ There is a discussion of this in the UK's Farmers' Weekly for August 12th, 2005, "Dissecting red diesel rules", when Red diesel was taxed at 4.22p/litre, white diesel at 53.27p/litre, and Ultra Low Sulphur diesel at 47.10p/litre.

³¹ An interesting discussion of this issue can be found in an IMF paper by Gupta and Mahler (1994), 'Taxation of Petroleum Products: Theory and Empirical Evidence'.

general, but not for one tax in particular. This is because the ‘hypothecation’ (or ‘ring-fencing’)³² of particular tax revenues for a particular use is rarely practised. And if it were, road-users would want the revenues spent on roads, not redistributive measures which benefit the poor. This is the problem with hypothecation – it constrains the use of the revenue source in ways which governments are always likely to find objection to.

Indeed, in the one notable case where gasoline tax receipts *are* hypothecated (the USA) it is precisely for the purpose of maintaining the road infrastructure. But even here there is reason to doubt whether such a hypothecation is really the real function of such taxes. Under current (2008) US law, motorists and truck owners pay a federal fuel tax – 18.3 cents per US gallon of gasoline³³ and 24 cents per US gallon of diesel – into a ‘Highway Trust’ which returns these fuel taxes revenues to the states according to a mathematical formula that attempts to measure each state’s need for road and transit projects. However, in addition to the fact that the proceeds of the tax are frequently distributed among the states in an inequitable manner, over time, their size (in real terms) has fluctuated inversely with the retail price of gasoline. For example, in 1960 when the real price of gasoline stood at \$1.12 per US gallon (\$1996 prices) the federal fuel tax was 22 cents per gallon. But when the price of gasoline rose to \$2.10 in 1981 the tax fell to 6 cents per gallon. Then in 1995, with another era of low crude prices and with the real price per gallon of gasoline at an all-time low of 75 cents, the fuel tax rose to 19 cents per gallon.³⁴ Not surprisingly, empirical analysis has concluded that ‘political influences seem as important as economic factors in shaping gasoline tax policy’ and that there is a “politically expedient negative relationship between price and gasoline taxes” (Goel and Nelson 1999, p.57). Clearly, if such taxes were really intended to pay for road building and maintenance, there would be no such pattern of inverse relationship.

A similar inverse relationship between price and tax levels (although not so pronounced) has characterised the ostensibly ‘environmental’ ‘fuel tax escalator’ introduced in the UK in 1993. The measure, introduced at a time when crude prices were historically very low, required an annual increase in the specific fuel duty of 3 percent above the rate of inflation later rising to 5 percent. When the New Labour government came to power in 1997, the price of crude had fallen to an all time low and the Chancellor, Gordon Brown, increased the escalator further to 6 percent above inflation.³⁵ However, when the price of crude more than doubled in 2000 and there were widespread protests by road transport haulers, the fuel tax escalator was put on hold. More recently, the opposition UK Conservative Party has explicitly announced a policy that, if they win the next election, fuel duty will be vary inversely with the price of crude oil (Financial Times, 7/7/2008).

Clearly there is little evidence of any environmental principle informing fuel tax policy but rather the need to raise general government revenue and the fact that it is easier to do this when crude prices are low. This general conclusion is confirmed by Reitveld and Van Woudenberg (2005) whose econometric work concluded that,

³² ‘Hypothecation’: You are said to ‘hypothecate’ a mortgage when you pledge it as collateral for a loan.

Sometimes ‘hypothecate’ means pledging something to a specific purpose.

Ring-fencing: ‘ring-fencing’ has been in use since the 1980s to denote the funds that are set aside for a project and cannot be spent on anything else.

³³ In addition the individual US states levy gasoline taxes ranging from 8 cents to 28 cents per gallon.

³⁴ State (as opposed to federal) fuel taxes also behaved in the same way, except that the inverse relationship was less pronounced (See Goel and Nelson 1999, p.45)

³⁵ In fact, in 1998 when crude prices fell to exceptionally low levels, seven of the fifteen EU members raised excise duties. (Al-Abdallah, 1999, p.10)

there is strong evidence that fuel is just considered as one of the many sources for government expenditure: as the share of government expenditure in GDP is higher, the fuel tax tends to be higher. *No support is found for the hypothesis that fuel taxes are higher in countries where externality problems are more severe ...* In this respect, the normative literature on pricing externalities has found little support in the realities of transport policy. (Reitveld & Van Woudenberg, 2005, p.89, our emphasis)

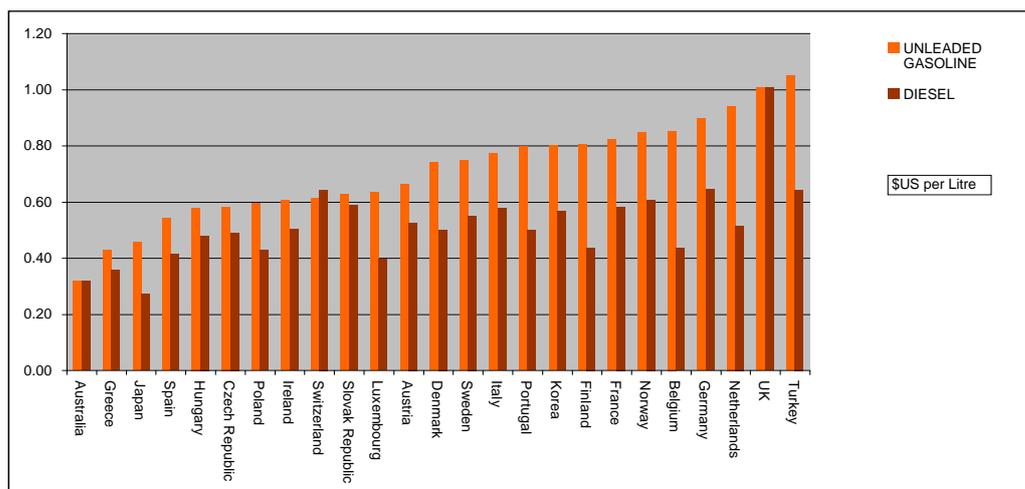
To these general points about excise taxes on petroleum products, we can now add some detail about how they are applied, and also investigate the extent to which such taxes are levied on natural gas.

6.2.1 The Application of Excise Taxes to Petroleum Products

As indicated above, special excise taxes on petroleum products are generally levied at specific absolute rates – they are not ‘ad valorem’ or proportionate taxes like VAT. This means that they require more government intervention to manage: while VAT receipts will increase automatically with the value of sales, revenues from excise taxes will only respond to volumes. Which in turn, means that they attract a regular political spotlight, both for this reason and because unlike VAT, groups capable of powerful lobbying (industrial and commercial organisations), do have to pay them like other consumers. We can therefore expect much less regularity in special excise taxes on petroleum products, both in terms of the historical setting of the initial baseline rate (the influence of inherited custom and practice significantly constrains the extent to which governments can become more consistent and compatible with the practices of other governments) and in terms of how the rate is changed each year. With respect to the latter, the conceptualisation of appropriate criteria is difficult, inviting *ad hoc* variety which also responds to changes in political regime. One final introductory and perhaps surprising point about these taxes is that they are generally subject to VAT – VAT being levied on the value of sales *including* the excise tax. This immediately highlights the pragmatic nature of downstream petroleum taxation – VAT is supposed to be a tax on ‘value added’ and should therefore be levied on the refinery gate price not on another tax as well. It is however obviously convenient for governments to overlook taxation principles in this case because any given increase in the excise tax will also bring with it increases in VAT revenues.

Proceeding from these general points to look at specific practices, we shall now examine in detail at a selection of individual Energy Charter member countries. Here, therefore, and from a vast number of potential examples, we shall attempt to illustrate three basic features of the application of special excise taxes on petroleum products. Firstly, we shall illustrate *different levels* of tax between countries. Secondly, we shall illustrate different ways in which taxes on other petroleum products are *differently taxed* in relation to gasoline. Thirdly, we shall illustrate *different rates of change* over time.

Figure 19: Excise Taxes on Gasoline and Diesel: Selected Countries



Source: derived from IEA (2008)

Notes: a) the data was derived taking the Excise Taxes listed in national currencies on pp.xxvii-xxviii of the IEA’s *Energy Prices and Taxes*, converting them to US dollars using average exchange rates for 2007; b) Excise Taxes include all non-VAT taxes levied on energy; c) only OECD countries for which both gasoline and diesel taxes are available were selected i.e. Canada, Mexico, the USA and New Zealand are excluded, the USA because its system of state and federal taxes makes international comparisons of excise taxes difficult; d) all the countries listed apply the same rate of excise tax to gasoline and automotive diesel.

The different levels of tax are very easily illustrated from a sample of OECD member countries (Figure 19).

The disparities are huge with excise taxes on gasoline ranging from 32 cents per litre in Australia to over a dollar in the UK and Turkey. These become more complex once automotive diesel is also included. Firstly, as for gasoline, a wide range of rates is being applied – although in the case of diesel the UK emerges as having the highest rate by a margin of 37 cents. Secondly, with only three exceptions (the UK, Australia and Switzerland³⁶) all these countries apply much lower excise taxes to diesel than they do to gasoline. Thirdly, diesel is clearly *differently taxed in relation to gasoline* in different countries – Figure 19 reveals a wide variety of practice in this respect.

Nineteen of the countries shown in Figure 19 are also members of the European Union which means that we can also conclude that, as was the case with respect to VAT (Figure 15), there are wide disparities between the levels of excise taxes on petroleum products in different EU member states. This reinforces earlier research by Newbery (2005, p.2) which quantified these disparities: in 2002 there was a 33% variation (coefficient of variation) around an average EU excise of 306 Euros per tonne of oil equivalent. Other recent empirical work carried out by Dreher and Krieger (2008) has investigated the extent to which tax-inclusive (consumer) prices and tax-exclusive (producer) prices are, in fact, converging in the EU and the speed at which this convergence is taking place using eleven years of data from 1994 to 2004. While there may still be wide variations in fuel excise taxes, is there also an observable trend towards standardisation? Certainly one might expect this to be the case, not only because of

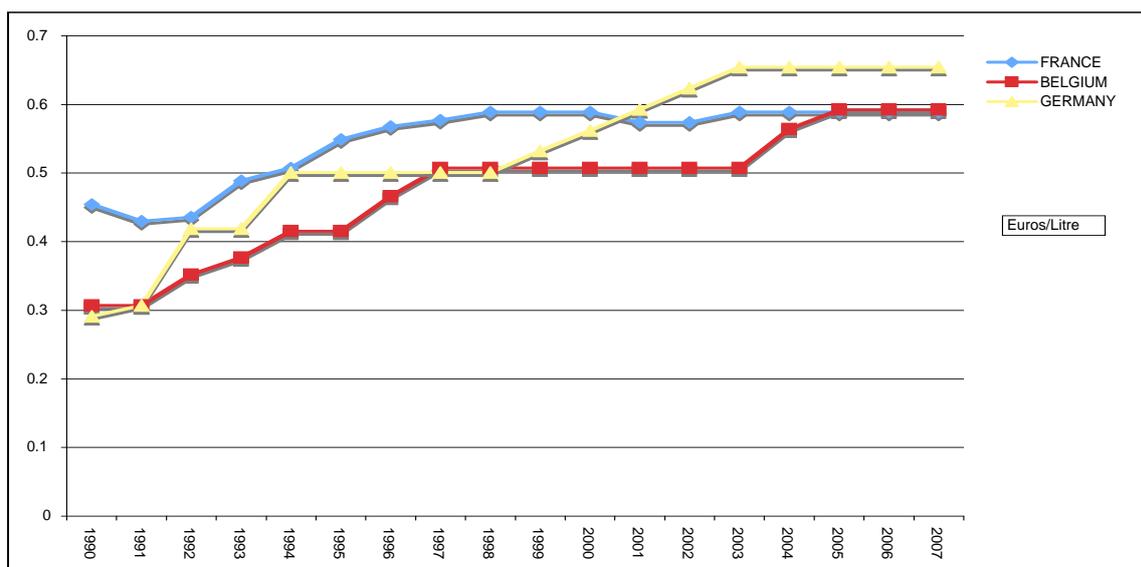
³⁶ Excise taxes on diesel in Switzerland are exceptional because this is only country where they are greater than those applied to gasoline. Moreover, while the IEA’s categorisation of Excise Taxes for this data does include all non-VAT taxes and would therefore include Switzerland’s ‘Emergency Fund’ special tax (to fund strategic stocks), it is in fact the pure excise tax on diesel which is actually greater than that which is applied to gasoline.

the effects of arbitrage, but also because the EU should be concerned to eliminate it. However, Dreher and Krieger’s econometric work concluded that,

Evidence for convergence of tax-inclusive prices (indicating successful arbitrage through cross-border shopping) is far less than evidence for convergence of tax-exclusive (or producer) prices. Producer prices converge both at a higher speed and – for euro super and diesel – even to absolute parity. Consumer prices converge slower and level differences between countries remain. This result shows that taxation alone is able to segment an otherwise efficient integrated market into separate national markets, a process which cannot be counteracted by price competition any more. While the impact of the spot market makes the supply or producer-side price almost a single-location market with a high speed of convergence – similar to a stock market – after introducing taxes, large level differences sustain and the dynamics of price convergence are slowed down substantially for tax-inclusive prices.

These less than encouraging conclusions are further borne out by the data in Figure 20 which demonstrates how disparate both levels and changes in excise taxes in gasoline (and hence tax-inclusive prices) can be even for countries which border on each other and are members of both the European Union and the Euro zone.

Figure 20: Excise Taxes on Unleaded Gasoline in Belgium, France & Germany 1990 – 2007



Source: IEA (2008)

Note: If excise taxes changed more than once in a particular year, the rate which applied for the largest part of the year has been selected

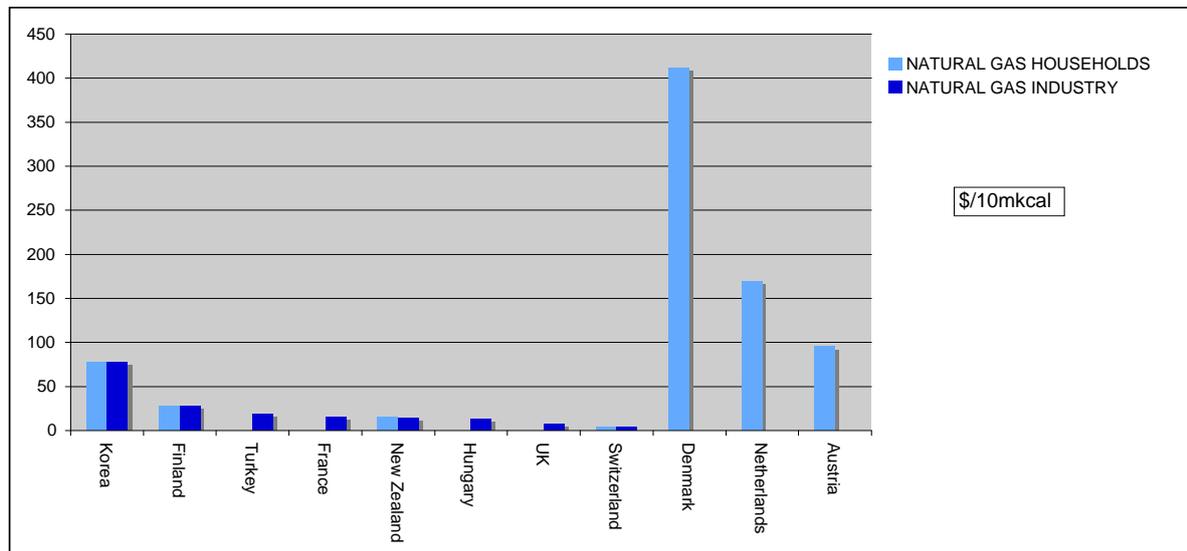
With respect to other petroleum taxes, eight out of the 29 OECD countries do not provide information about / do not apply excise taxes on Light Fuel Oil. Of those that do, three apply different (much higher) rates for households compared to industry.

6.2.2 The Application of Excise Taxes to Natural Gas

From Figure 21, again drawing on the most recent IEA data, four main points can be made about the application of excise taxes to natural gas:

- It is the practice of a minority of countries;
- It is applied more to households than to industry;
- Rates vary very widely;
- In some cases the excise taxes are in fact environmental taxes.

Figure 21: Excise Taxes on Natural Gas: Selected Countries 2008



Source: derived from IEA (2008)

With respect to the latter point about environmental taxes, the very small excise tax applied to natural gas in the UK is the ‘Climate Change Levy’ (and this is meant to be broadly tax neutral by way of corresponding reductions in employer national insurance contributions), while the much larger tax applied to households in the Netherlands is an energy tax designed to stimulate energy savings.³⁷ The relatively high rates applied to households in Denmark and Austria are pure excise taxes.

6.3 Energy / CO₂ Taxes

While Excise Taxes on petroleum products have been widely adopted throughout the world, with a few exceptions their role as environmental taxes must be viewed as incidental (as we have seen). Taxes with a specific environmental intent are various, but in the context of this study we confine our attention to two classes of taxes: general *energy taxes* which have been introduced with the objective of reducing energy consumption, particularly from fossil fuels, and *CO₂ taxes* which are concerned to tax carbon emissions. One of these taxes addresses inputs and the other outputs. Energy taxes geared specifically to reducing CO₂ emissions are referred to as ‘Carbon Taxes’ because they tax carbon *use*. Both classes of tax aim to achieve reductions in emissions of the main greenhouse gas. Energy taxes seek to do this by targeting consumption directly while Carbon Taxes and CO₂ taxes also create an incentive to switch out of using fossil fuels which have higher CO₂ emissions per unit of output (e.g. coal compared with natural gas). As such they fall into the category of ‘market-based’ instruments for addressing greenhouse gas emissions. As is the case with excise taxes on petroleum products, they are generally conceived of as payment for the external environmental costs of energy

³⁷ For a critique of the Netherlands ‘energy tax’ model see, Volebergh (2008)

consumption, although, in contrast to other kinds of excise tax, they are also often presented as part of a ‘tax neutral’ package which accommodates them with reductions in other forms of taxation.³⁸

However, both the United States and the European Union have rejected the use of energy / carbon taxes as the main vehicle for reducing greenhouse gas emissions. A proposal for a ‘BTU Tax’ was tabled by the first Clinton Administration in 1993, but was withdrawn under pressure from the business lobby in June of that year. As the *Nation’s Business* (July 1993) commented:

The BTU tax included in the plan adopted on May 27 by the House of Representatives would have raised about \$71.5 billion over five years and cost each household an estimated \$400 to \$500 a year. It would have been based on the heat content of fuels as measured in BTUs and would have been imposed on coal, crude oil, natural gas, hydropower, and nuclear power. It would have affected imports as well as domestically produced energy.

The European Union also considered a Carbon Tax but opted instead to rely on the introduction of an emissions trading system in 2005. As a result, these taxes are not in fact widely used and although there are exceptions to this (e.g. the Netherlands’ energy tax on the consumption of natural gas), because of measurement issues they generally target intermediate fuel use by business rather than the end-use of specific fuels by final consumers.

Specific examples / applications of Energy / CO₂ taxes in Energy Charter member countries will be considered in the next section of this report. Here suffice it to refer to the conclusions of a very recent study from the European Union (2008, p.8):

Experience of Member States has shown that CO₂ / energy taxes can have a significant impact on fossil fuel consumption / greenhouse gas emissions (e.g. Sweden, Germany). This can be achieved without a significantly adverse impact on the wider economy. By increasing the price of use of fossil fuels, taxes can also provide a strong stimulus for investment in alternative renewable energy sources. Member States also reported however, that sectoral competitiveness concerns often limited the application of such taxes – in Germany for example, such concerns required exemptions from ecological taxes for coal and much industrial energy use. Sweden has similarly maintained very low energy tax rates on electricity and heating oil for its industry.

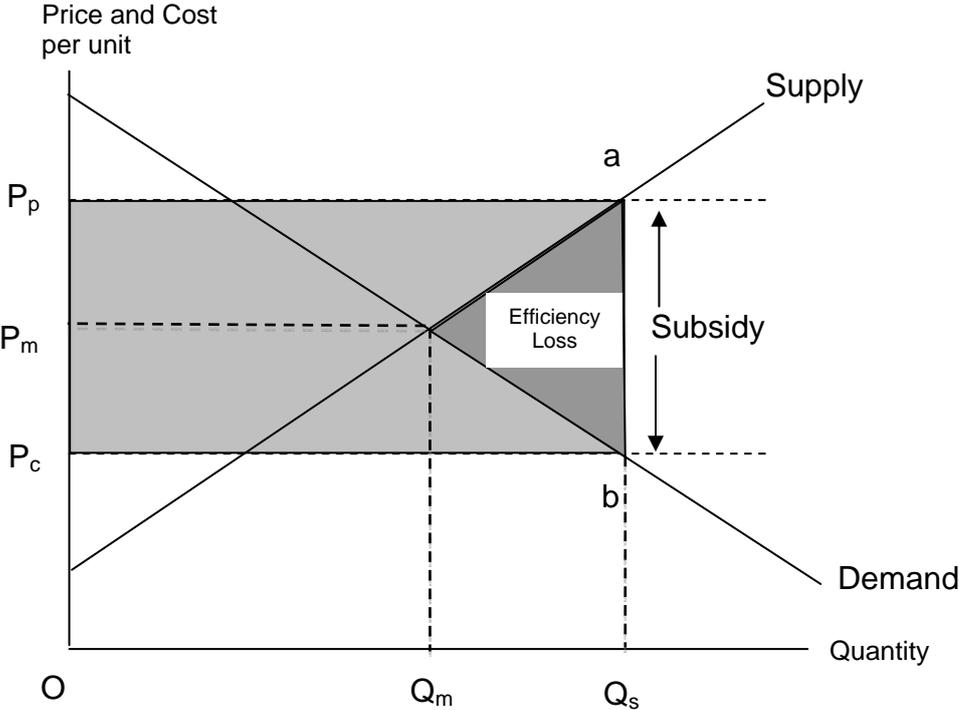
6.4 Subsidies for Petroleum Products and Natural Gas

At its apparently most straightforward, an activity may be deemed ‘subsidised’ if it is taking place at below its cost of production by virtue of a transfer of funds from either government or a profitable private sector line of activity (the latter being referred to as a ‘cross-subsidy’). For example, the World Bank defines ‘subsidies’ as ‘the reduced cost of a good with government support and its cost in the absence of such support’ (World Bank. 1997). Similarly, the *Oxford Dictionary of Economics* defines ‘subsidy’ as ‘A payment by the government to consumers or producers which makes the factor cost received by producers greater than the market price

³⁸ It should be noted however, that some commentators are sceptical about the extent to which the taxation of CO₂ would be ‘neutral’. For example, Al-Abdallah (1999) states, ‘The EU’s proposal on the CO₂ tax underlines the need for the tax to be fiscally neutral. This commitment means that the revenues from the CO₂ tax would be used to reduce other taxes. However, this commitment has faded, as member states with mounting budget deficits become aware of the revenue-raising potential of “environmental” taxes.’ (Al-Abdallah, 1999, p.8)

charged by producers.’ (Black, 2002, p.451). However, this apparent simplicity evaporates once a subsidy is also deemed to be ‘inefficient’. This is because to be able to identify ‘inefficiency’ there has to be a corresponding benchmark designating what would be an ‘efficient’ cost of production, something which neoclassic economic theory can only identify using the unrealistic assumptions of perfect competition (see Figure 22).

Figure 22: The So-called ‘Efficiency’ Loss Caused by a Subsidy



Notes: As in Figure 22, the market is assumed to be perfectly competitive with the demand and supply schedules representing respectively the marginal benefit and marginal cost of producing a commodity. Following the application of a subsidy, the quantity of the commodity produced and consumed increases from Q_m , the equilibrium market level which would prevail in the absence of the subsidy, to Q_s , the subsidised level. The gross benefit enjoyed by consumer and producers is the shaded rectangle P_pabP_c but the net benefit is this rectangle minus the dark grey shaded triangle: this is the ‘efficiency’ loss arising from the fact that at this level of output the cost to society in producing an incremental amount of the commodity is greater than the benefit which the consumer enjoys from consuming an incremental amount.

However, despite the fact that the unrealistic assumptions required by this approach allow no practical application, it still conveys an essential truth: unless we have an objective benchmark it is impossible to deliver an objective definition of subsidy. The presence of a subsidy in the real world therefore tends to be pragmatically rather than objectively detected, in two different ways.

First of all, an activity may be deemed ‘subsidised’ if it requires a transfer payment from government or from a profitable private sector activity in order to cover either its current operating costs or, to suit the context in question, its operating costs + capital costs. This is the essence of the World Bank and Oxford Dictionary definitions above. But such pragmatism, trying to work round the lack of an objective benchmark, inevitably gives rise to problems. For example, some subsidised activities carry on over long periods of time without anyone

referring to them as such because they do not actually require a current operating subsidy: the need for a subsidy only becomes apparent when investment requirements or major externalities are taken into account. Nuclear power is a case in point because future decommissioning liabilities are difficult to monetise and therefore likely to require public subsidy in the long-term. When this happens, the *ex post* defence may be that the activity did not appear to be subsidised *ex ante*.

Secondly, it has become conventional to depict as subsidised, activities which, while covering all their costs of production, take place at prices below the 'international market price'. And it is just such situations which beset the oil and gas markets. For example, it is commonplace that both petrol and natural gas are sold at below international market prices in countries which produce either oil or gas or both. Even allowing for a purchasing power parity adjustment, it will still be the case, for example, that a Venezuelan citizen will be able to fill up his or her car with gasoline much more cheaply than a citizen of the United States. In criticizing such a practice the argument used will be its opportunity cost – in defying the market in this way a government would be said to be impeding an 'efficient' allocation of resources at the expense of its citizens. The resources foregone could have been put to better use (See, for example, Gurer & Ban (2000)).

Even though there is no cash cost associated with such a pricing regime inside Venezuela, the suggestion is that it is still equivalent to the practices of Indonesia and Malaysia, for example, countries which need to deploy real money in order to provide acceptable fuel costs for their citizens.

At this point, the difficulties which we have identified in deploying the concept of subsidy may usefully be illustrated by reference to an IEA (1999) study of energy market subsidies and to a recent review of world transport fuel prices by the German Federal Ministry for Economic Cooperation and Development. The IEA, for example, begins its study by conceding that 'Discussions about what a subsidy is have never really been settled on a consensus basis.' (IEA, 1999, p.43). The German Federal Ministry for Co-operation and Development faces this problem by resorting to an international benchmark approach (GTZ 2007, p.2):

The concept of 'subsidisation' used here relates to a benchmark whereby fuel pricing is commercially calculated with reference to world market prices, prevailing legislation and the normal course of business as the "normal" commercial filling-station price of fuel net of tax. These are the prices used as the benchmark price. In this sense 'subsidisation' is said to take place when the actual pump price is below the benchmark price which would be arrived at by price calculation on a commercial basis.

However, the GTZ report then concedes that "'normal' prices are very difficult to determine with precision, for practical reasons and with a view to worldwide applicability". The 'benchmark' which emerges is therefore clearly arbitrary:

For the purposes of this publication fuel prices will be classified as "subsidised" where they are below the average US price-level, after making a deduction for highway tax...' (GTZ, 2007, p.2)

Returning to the IEA study, its reference price for the purpose of identifying subsidy is developed as follows:

The reference price indicates the opportunity cost of one unit of energy, its true economic value. It corresponds either to the border price for internationally traded energy products or to the costs of production for non-traded ones, both adjusted for transport and distribution costs. In undistorted markets the border price and the domestic production costs are the same.’ (IEA, 1999, p.72, our emphasis)’.

A more detailed exposition of this IEA paper is included in Chapter 8.1.2 below, however for the time being we merely note the strongly normative emphasis in the paper’s conclusions resting on the central point that subsidies ‘distort’ the markets for energy. The problem is though, that the world market for oil must surely be one of the most ‘distorted’ of all markets given the interventions of governments and speculators and the fact that they take their cue from dramatically changing perceptions of future uncertainties. In consequence, the long-run marginal cost of production which one might expect to drive price in a competitive market is only a fraction of the current price per barrel. We should also specifically recall from the earlier sections of this report that the oil market is very substantially distorted by taxation.

A case-by-case empirical approach to the question of petroleum subsidies is therefore likely to be more fruitful than an abstract theoretical approach. Thus if the government of Chinese Taipei, for example, wishes to subsidize the fuel costs of its citizens and businesses, the objection cannot be that this is ‘bad’ *a priori*. Rather, the value of this policy has to be judged pragmatically on the basis of its impact on state finances, on the country’s balance of payments and on the importance which the citizens of Chinese Taipei accord it over time. Over time, opportunity costs will assume a political reality if subsidising gasoline begins to threaten the provision of basic health care or other essential services. Also, if the policies of individual countries run counter to international efforts to restrain the consumption of hydrocarbons, then these policies become subject to international diplomacy.

6.5 Emissions Trading

Emissions trading is the currently favoured market-based instrument for controlling greenhouse gas emissions. It differs from the use of taxation because it involves administrative intervention as well as the use of the market – a combination which is often referred to as ‘cap and trade’. The ‘cap’ refers to the overall ceiling on emissions which a country or group of countries may decide is desirable. Once this cap has been established, ‘permits to pollute’ are allocated up to the level of the cap. Polluters then have a choice: they can continue to pollute beyond their allocation, but they will have to pay another country or company for a certificate to do so, or face a penalty. The supply of certificates for sale to polluters comes from those who have been able to reduce their emissions beyond their permitted allocation or from an over-allocation of permits in relation to pollution. The preference for trading over taxation and other forms of administrative intervention is based on the idea that the market will be more efficient in discovering where the potential for reducing emissions lies – the scheme is permissive in not trying to force emissions reductions out of those who are unable to achieve them. However, it also needs be noted that emissions trading initially found favour as of its application to reducing sulphur dioxide emissions in the United States and its application to CO₂ emissions is quite different – the scope for mitigation of CO₂ emissions is much more restricted and difficult. At present the main ways of reducing CO₂ emissions are by reducing fuel consumption or by switching to fuels with lower emissions (e.g. from coal to natural gas or to renewables or nuclear).

Emissions trading is considered in this report in order to assess whether it has any significant influence on final prices of petroleum products and natural gas, and therefore on the demand

for them. Although there are some theoretical estimates (see e.g. Ghanem, Lounnas & Brennan, 1999) the immediate answer to this question is ‘not yet’ and for three main reasons. First of all, it is in its infancy – the largest scheme in the world, the one devised by the European Union, was only introduced at the beginning of 2005. Secondly, and like all schemes worldwide, issues of practicality and vehicle politics means that it only covers ‘fixed sources’ – 11,500 of them covering some 45% of EU 25 CO₂ emissions (EU Economic Policy Committee 2008, p.17). In other words, it does not cover the transportation sector – which is of course the largest and fastest growing of the demands for petroleum products. Caps on fixed sources only impinge very indirectly on this demand via their impact on refineries. Thirdly, its effect on natural gas would be positive rather than negative – emissions trading favours natural gas because, per unit of energy input, it only has 56% of the CO₂ emissions of coal and 71% of those of oil. In this context, the effect of emissions trading on natural gas would be mainly via a demand effect than via the cost of a permit for the amount of carbon resulting from its combustion. Fourthly, because of ‘over-allocation’ of the initial round of permits in the EU scheme, the price of carbon has been very low – such that its effect has in any event been minimal.³⁹

³⁹ For useful discussion of the early days of the European Union’s Emissions Trading Scheme, see Ellerman A.D. and Buchner B.K. (2007), The European Union Emissions Trading Scheme: Origins, Allocation, and Early Results, *Review of Environmental Economics and Policy*, volume 1, issue 1, winter 2007, pp. 66–87

7 Downstream Taxation in Energy Charter Countries and Double Taxation Issues

7.1 Downstream Taxation in a Selection of Energy Charter Countries

The member countries selected are Australia, Japan, Norway, Russia, Spain, Sweden, Turkey and the UK. The rationale for this selection is its wide geographical diversity and the embrace of a variety of downstream taxation approaches, as follows:

Australia (maximum endorsed wholesale prices for oil products; considerable state-level discretion in downstream taxation of natural gas)

Japan (use of excise and consumption taxes applied differently to different products)

Norway (use of CO₂ tax, major oil and gas exporter)

Russia (major oil and gas producer and exporter with domestic prices and downstream taxes well below international levels)

Spain (use of regional and municipal taxes)

Sweden (use of energy and CO₂ taxes)

Turkey (high level of taxation relative to income level)

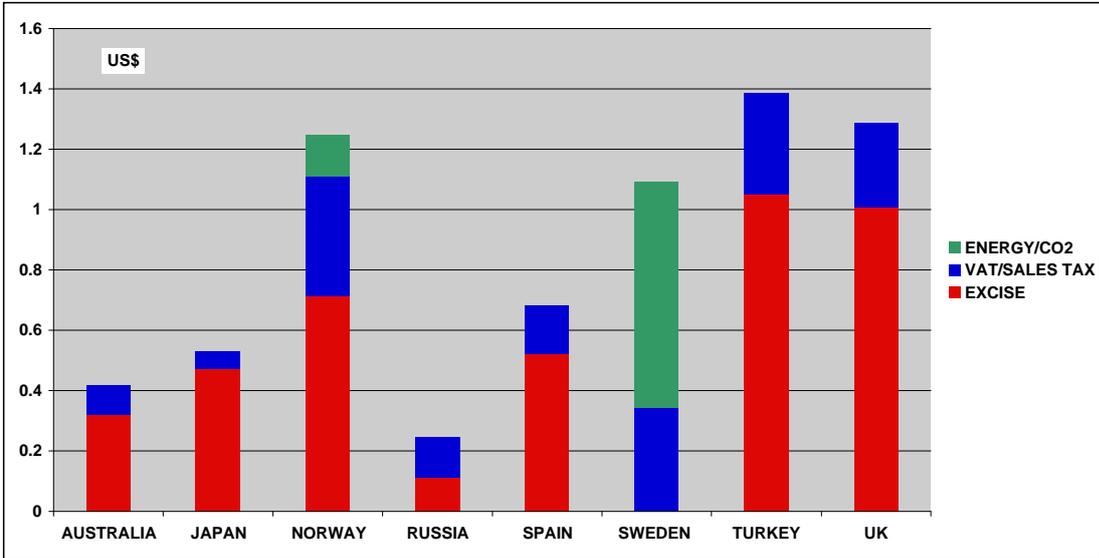
UK (to observe migration of taxes from upstream to downstream)

The approach adopted to both illustrate and analyse these different tax regimes will be, firstly, to compare the levels and compositions of downstream taxes on different fuels in the different countries. Secondly, differentials in the levels of ex-tax prices will be examined. Thirdly, the case of the UK, as both a major producer and consumer, will be used to explore the changing relationship between upstream and downstream taxation over time.

7.1.1 Comparative Levels and Composition of Downstream Taxes

Considering first the comparative levels and composition of taxes in the selected countries, Figure 23 brings these together for gasoline sold to households (i.e. VAT is included). The difference in levels is immediately apparent, with the largest overall level of taxation being around seven times higher than the lowest. The ordering of the levels is also perhaps surprising with Turkey having the highest level followed by the UK, Norway, Sweden, Spain, Japan, Australia and Russia. The latest World Bank Development Indicators (for 2006) show the per capita incomes of these countries (using Purchasing Power Parity methodology) to be ranked as Norway (4), Sweden (20), Australia (26), UK (29), Japan (31), Spain (39), Turkey (99) – (data for Russia is not available). In other words, bearing in mind its income level, Turkey has a very high level of tax compared with the other countries and the UK, an oil producer, has a very high level compared with Japan, a major importer.

Figure 23: Comparative VAT, Excise and Energy / CO2 Tax Components in Gasoline Purchased by Households (\$US per litre, 2007)



Notes: All countries apart from Japan apply VAT to non-VAT taxation. The Russian excise tax rate is assumed to \$153 per tonne (Moscow Times 8/5/08).

Source: derived from IEA (2008)

In terms of the composition of taxes, Sweden stands out as having switched the emphasis of its taxation of gasoline to energy taxation. Otherwise, the contribution of VAT varies according to the different rates in the different countries (which varies from 5% in Japan to 25% in Sweden and Norway), to the different levels of excise tax (recalling that all countries except Japan levy VAT on excise taxes) and ex-tax price differentials (see below).

Figure 24: Comparative VAT, Excise and Energy / CO2 Tax Components in Diesel Purchased by Households (\$US per litre, 2007)

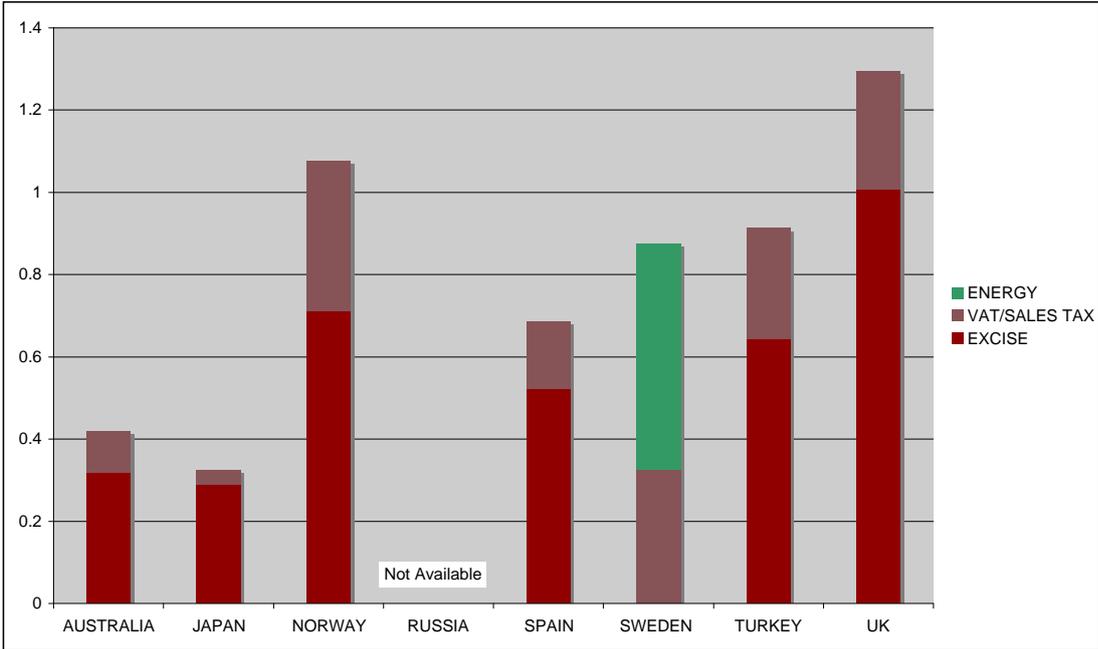
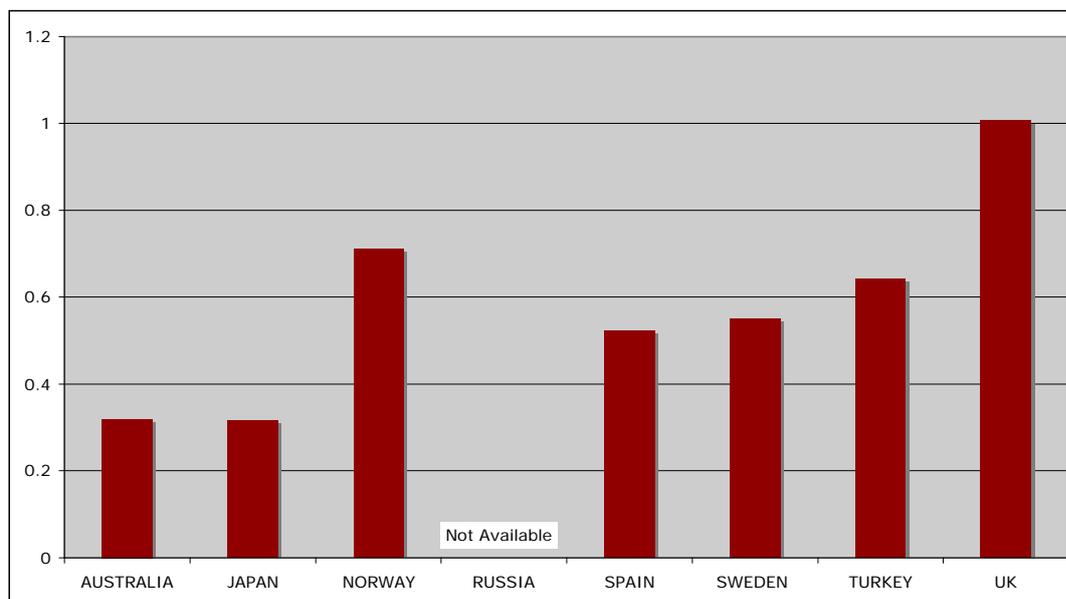


Figure 25: Comparative Tax on Diesel Purchased by Commercial Users (\$US per litre, 2007, excluding VAT)



Sources: derived from IEA (2008)

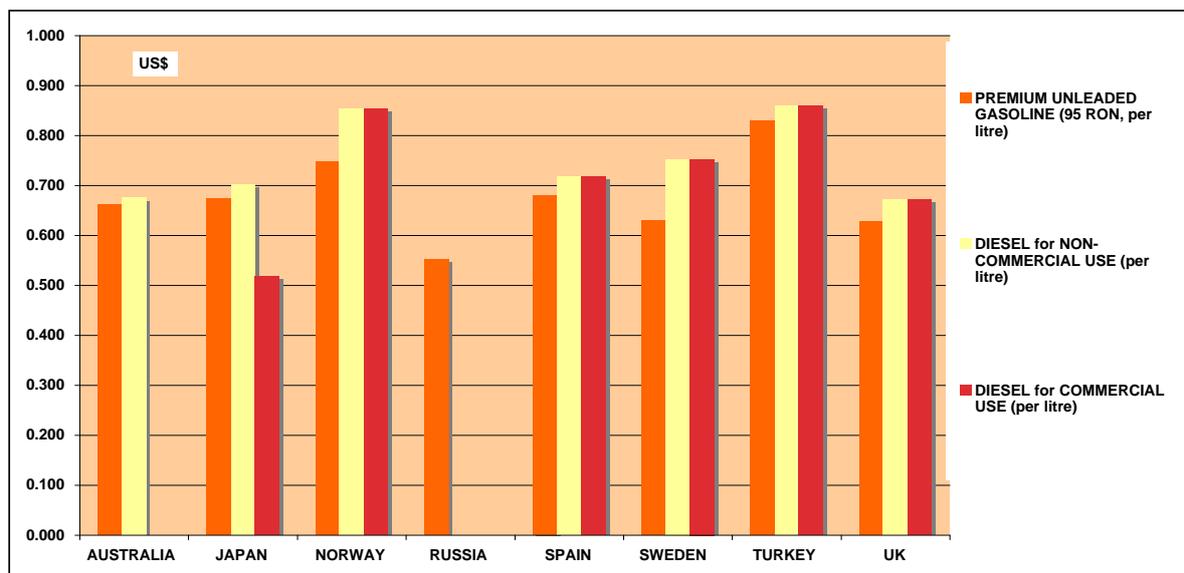
Turning to diesel, Figures 24 and 25 provide comparisons both with the position of gasoline and for non-commercial users (households) vs. commercial users. Comparing first of all diesel purchased by households and gasoline purchased by households, there are some marked differences in the tax regimes. Reflecting the fact that many countries apply different (lower) rates of excise tax to diesel compared with gasoline, the relative burden of taxes on diesel changes with respect to gasoline: the UK, which applies the same rate of excise tax to diesel as it does to gasoline, emerges as having the highest taxed diesel for non-commercial users (referring back to Figure 19, the UK's tax rate on commercial diesel is probably the highest in the world). The UK and Norway together push Turkey into third place and the positions of Australia and Japan are reversed, with Japan having lower rates of tax on diesel sold to households than Australia. The comparative position for commercial users of diesel, who do not pay VAT / Sales Tax is shown in Figure 25: the difference between the UK and other countries emerges as even more significant.

Partial data for the taxation of other oil products can be found in Appendix H. For Light Fuel Oil for Industry there is data for Japan, Norway, Spain, Sweden and the UK – showing the UK having the highest (excise) tax rate, followed by Norway. For Low Sulphur Fuel Oil Sweden has by far the highest rate. Natural Gas tax rates in the selected Energy Charter countries are also shown in Appendix H, with the main variations caused by large differences in VAT rates as follows: Australia (10%), Japan (5%), Norway (25%), Russia (20%), Spain (16%), Sweden (25%), Turkey (18%), UK (5%). Only three countries impose other taxes on natural gas: Australia has state-level sales taxes which are not registered with the federal government, Spain has a municipal sales tax which reaches a maximum of 1.5% of the ex-tax price, Turkey has a tax of \$17.9 per 10Gkcal which only applies to commercial users.

7.1.2 Ex-Tax Prices

The pattern of ex-taxes in the selected countries is shown in Figure 26 for both gasoline and diesel. There is clearly variance between the countries, probably driven mainly by cost, but it is small compared with the differences delivered by tax differentials: the difference between the highest price for gasoline (Turkey) and the lowest (Russia) is only about 28 cents.

Figure 26: Ex-Tax Prices of Gasoline and Diesel (\$US per litre, 2007)



Source: derived from IEA (2008)

Diesel prices are consistently higher than gasoline, but the differentials vary for each country – being higher in Sweden and Norway, for example. While the ex-tax price of diesel is the same for commercial vs. non-commercial use in six of the countries for which the data is available, it is not in Japan where there is a considerably lower ex-tax price for non-commercial use.⁴⁰ This might imply the presence of a cross-subsidy, but it could also reflect differences in distribution costs.

7.1.3 Changing Balance between Upstream and Downstream Taxes on Petroleum

Does the level of downstream taxes affect the level of upstream taxes and *vice versa*? In order to look into this we use the case of the UK because the country is both a major producer of hydrocarbons and a major consumer which, as we have seen, imposes a heavy burden of tax downstream. Table 3 shows how the UK’s revenues from upstream taxation changed in relation to downstream revenues from the taxation of petroleum products. Firstly, between 1987 and 1999, the ratio of downstream taxes to upstream taxes changed dramatically from 1.9 to 11.7 – this corresponded to a reduction in the proportion of upstream sales revenue taken in tax from 36.8% in 1987 down to 13.3% in 1999, and an increase in the proportion of downstream sales revenue taken by tax from 45.6% to 71.7%. Secondly, after 1999, there was a reduction in the downstream tax take to 51% in 2006 while upstream taxes increased their share in upstream sales revenues from 13.3% to 37.6%, accompanied by a corresponding decline in the ratio of downstream to upstream taxes from 11.7 down to 3.3.

⁴⁰ This is not explained by the fact that the Japanese ex-tax price does include a small excise tax levied on all crude oil refined in Japan – this is included in the ex-tax prices of all petroleum products, except LPG.

These movements are interesting because they suggest a reciprocity between upstream and downstream taxation which could be causal – as the downstream claims higher levels of taxation, the upstream level must decline. Or, as the upstream level increases, the level of downstream taxation must decline. The latter seems more plausible because increasing levels of upstream taxation are generally associated with higher crude oil prices, which in turn reduce the economic space for raising taxes downstream. Reductions in upstream taxation are, in contrast, more likely to be driven by apparently detached upstream policy aimed, for example, at offering companies tax breaks so that they invest and produce more in a particular oil province. There are still possible indirect links however, particularly if the process is incurring within national boundaries – a government may decide that it can afford to relax taxes upstream because it can more than recoup any revenue losses downstream.⁴¹ In any event, the changing balance of upstream and downstream taxation observed in the UK begins to address the subject matter of Chapter 8.2 – the changing distribution of oil and gas revenues up and down the gas chain. Moreover, we can begin to perceive a process – a cyclical pattern seems to be observable in the UK which does suggest that there are limits to the extent to which upstream revenues can be squeezed to the advantage of the downstream without provoking a counter-reaction which has the opposite effect.

⁴¹ Interestingly, the recent proposal by the UK Conservative Party that downstream taxes could be reduced in times of exceptionally high crude prices (see Financial Times 7/7/2008) is based on the argument that the impact of this on government revenue would be compensated by the increase in upstream tax revenues arising from the same higher crude prices.

Table 4: Upstream and Downstream Taxes in the UK 1987 to 2006

	1987		1990		1999		2002		2006	
	£million	% of Sales Value	£million	% of Sales Value	£million	% of Sales Value	£million	% of Sales Value	£million	% of Sales Value
UPSTREAM										
TOTAL UPSTREAM TAX REVENUES	4,645	36.8	2,343	19.5	2,563	14.7	4,968	20.6	9,072	27.3
<i>of which Licence Fees</i>	27	0.2	31	0.3	53	0.3	63	0.3	57	0.2
<i>Royalties</i>	1,024	8.1	605	5.0	389	2.2	434	1.8	0	0.0
<i>Petroleum Revenue Tax</i>	2,296	18.2	860	7.2	853	4.9	958	4.0	2,155	6.5
<i>Corporation Tax</i>	1,298	10.3	847	7.0	1,148	6.6	3,263	13.5	4,060	12.2
<i>Supplementary Charge</i>							250	1.0	2,800	8.4
SALES VALUE OF NORTH SEA OIL & GAS PRODUCTION	12,610	100.0	12,016	100.0	17,450	100.0	24,118	100.0	33,244	100.0
DOWNSTREAM										
PRE-TAX, PRE-DISTRIBUTION VALUE OF DOMESTIC CONSUMPTION OF PETROLEUM PRODUCTS	8,005	41.1	11,930	43.7	10,105	24.5	11,650	29.5	25,420	43.0
DISTRIBUTION COSTS & MARGINS	2,430	12.5	2,435	8.9	1,255	3.0	1,920	4.9	3,470	5.9
TOTAL EXPENDITURE TAX	9,035	46.4	12,960	47.4	29,960	72.5	25,910	65.6	30,205	51.1
<i>of which VAT and Petrol Duty paid by road users</i>	8,870	45.6	12,800	46.8	29,640	71.7	25,525	64.7	29,520	50.0
TOTAL DOWNSTREAM SALES VALUE	19,470	100.0	27,325	100.0	41,320	100.0	39,480	100.0	59,095	100.0
RATIO OF DOWNSTREAM TO UPSTREAM TAXES	1.9		5.5		11.7		5.2		3.3	

Source: BERR (2007)

7.2 Double Taxation Downstream

Double taxation is clearly undesirable. However, while the principle that no taxable entity should be taxed twice over for the same activity by different tax jurisdictions is crystal clear and apparently impregnable in terms of natural justice, its application is the subject of considerable legal complexity. This is because determining which jurisdiction should have the right to tax a particular activity can be the subject of sharp conceptual and legal conflict.

Double taxation problems are most commonly associated with taxes on incomes: the OECD category “Taxes on Income, Profits and Capital Gains” (category 1000). Typically, should the profits of company X be taxed in country A or country B? The principle which is generally applied to resolve this question is apparently straightforward; the legitimate tax authority is the country in whose jurisdiction the company has both made the profits and has a ‘permanent establishment’. Permanent establishment, according to the OECD Model Tax Treaty Article 5(1) means ‘a fixed place of business through which the business of an enterprise is wholly or partly carried on’ (Olsen 2006, p. 17). This principle however simply begs the question of how to identify a ‘permanent establishment’ (PE) in specific contexts.

Olsen (2006, p14) addresses this question for pipeline operations and shows how, under the terms of the OECD Model Tax Treaty, a pipeline could qualify under any one of the following seven categories:

- (a) PE according to the basic rule, Article 5(1); or
- (b) A building site, or construction, or installation project, when the pipeline is built, Article 5(3); or
- (c) Passive income, if the pipeline is leased to third parties without any significant maintenance, Commentaries Article 5(1); or
- (d) A transport facility, Article 5(4) a (use of facilities for the sole purpose of delivery of goods); or
- (e) Of preparatory or auxiliary character, Article 5(4) e; or
- (f) A combination of a transport facility and of preparatory or auxiliary character, Article 5(4) f, or
- (g) An immovable property, Article 6.

These points about the double taxation of *incomes* are made by way of introduction to the questions raised by actual or potential double taxation. Here our concern is with double taxation issues associated not with the taxation of incomes, but rather with the taxation of *expenditure*. Are they the same? Here are some points to consider.

Firstly, with respect to excise taxes on consumption, these raise no general issues because they are generally paid in the jurisdiction where consumption takes place and there is no expectation that the tax could be reclaimed by intermediate business users. Thus, if a good whose price directly or indirectly includes an excise tax, is exported from country A to country B, the importer in country B would not expect to be able to reclaim this tax from country A. Just as there would be no facility for businesses to recoup excise taxes within national jurisdictions, there is none for them to recoup such tax from other jurisdictions. A road haulage company based in Belgium, for example, cannot reclaim excise tax paid in refuelling in France. However, there is also no possibility of double taxation: it is not conceivable that excise tax would have to be paid twice on the same expenditure.

This could only happen if the excise tax on e.g. gasoline were to be part of an export price from country A which was then taxed again upon being imported into country B. But such gasoline would price itself out of export markets.⁴²

Secondly, let us now think about these same issues in the context of VAT / sales tax – which is different from excise tax both because the appropriate tax jurisdiction is the subject of international discussion and agreement, and because it is recoverable. Recoverability raises additional issues in this context because, if there were to be double taxation, the intermediate user could have the right to reclaim VAT / sales Tax paid in two jurisdictions. However, if double taxation is avoided, recoverability issues are simplified (but not entirely eliminated because business users may still wish / be able to reclaim VAT / sales tax from jurisdictions in which they are not resident).

Thirdly, jurisdiction might seem a simple issue to determine, driven both by principle and practicality. Practicality, we have already referred to – if a country were to levy VAT on exports of petroleum products this would simple price them out of the market. The principle involved, referred to by the OECD as the ‘main rule’ (CTPA 2008), is that the place of taxation should be determined on the basis of customer location i.e. where consumption takes place. This may in turn seem straightforward to apply, and is indeed for physical supplies. Moreover, it would also seem to be made transparent by foreign trade – if a foreign currency payment is made for a supply, then surely the appropriate VAT / Sales tax jurisdiction would be the originator of the foreign currency payment (i.e. the customer), not the recipient? However, it is in the area of cross-border trade in services that ambiguities can arise and these are currently being addressed by an OECD consultation (CTPA 2008).

Fourthly, in thinking about cross-border services, here we home-in on the most significant issues which also draw out some analogies with the determination of ‘permanent establishment’ for the purposes of income taxation. By way of illustration, supposing that company X in country A engaged company Y in country B to develop a website for itself. It might seem straightforward to apply the ‘main rule’ in order to determine the appropriate jurisdiction for levying VAT – that it should be in country A, the location of the customer. However, if the website were to be hosted on a server located in country B, should not the appropriate jurisdiction be country B – where the consumption occurs? This ambiguity arises because of the geographical separation of the customer from the point of consumption – unless the point of consumption is defined as the location of the accessing terminal rather than the hosting server?

Fifthly, transferring these concepts to the downstream taxation of petroleum products and natural gas, their relevance would seem to be to a part of the downstream cost of petroleum products and natural gas – to their *transportation*, which brings us back to Olsen’s pipeline example – but applied to expenditure rather than income.

Consider these examples:

Example 1:

Company X with a PE in country A purchases pipeline services in country B from company Y with a PE in country B

⁴² This issue is not, incidentally, why ‘Excise Duty Free’ goods such as cigarettes and alcohol may be made available to travellers – this is because the purchasers and sellers are *between tax jurisdictions* when the sale is made.

The location of the customer is in country B which, under the main rule, would be the VAT / Sales tax location. Also, the flow of foreign currency would be from country A to country B, such that the service is unequivocally an export from country B and therefore exempt from VAT in country B.

However, the physical consumption of the service is clearly in country B – making it seem unlike services which are less tangible, business intelligence reports for example, which while created in one country might identifiably be used (read, fed into to decisions) in the purchasing company's country.

UK VAT rules can help clarify this situation (HM Customs and Excise 2002, Section 11.8, p.50):

If you supply advertising services to a business in France, the place of supply of your service is France. This is because your customer belongs in another member State and receives your supply for business purposes. Your customer is required to account for any VAT due in France.

Example 2:

Company X with a PE in country A purchases pipeline services in country B from its subsidiary company Y in country B.

Assuming that subsidiary company Y qualifies as a PE in country B, this change in the routing of the purchase changes the location of taxation – applying the main rule it becomes country B.

Example 3:

Company X located in country A owns a pipeline in country B from which it purchases transportation services to move gas from country C to country D.

Does country D, the location of the final delivery of the gas become the place of supply in this case? The answer would be no because the transportation service is offered in country B and the customer is Company X in country A. The question is therefore whether the location of taxation should be in country A or country B. And while company X is the customer for the service in country B, as it was in Example 1, the outcome is not as clear-cut: it depends on whether the ownership of the pipeline in country B by company X is taken to signify a PE. In other words, here the double taxation issues associated with taxes on expenditure would seem to overlap with those associated with taxes on income – where the customer is located becomes a legal question of definitions.

In summary, double taxation issues with respect to downstream taxation are about jurisdiction rather than about double taxation occurring in practice. Secondly, determining jurisdiction would seem to have generally accepted rules associated them which are clear and reinforced by whether or not the service is classified as an export by a particular country. The exception would appear to be when the legitimacy of a service-providing subsidiary as a PE is disputed – in which case the deciding criteria of 'where is the customer located?' may become ambiguous.

8: RELATIONSHIPS BETWEEN DOWNSTREAM TAXES AND SUBSIDIES AND UPSTREAM OIL AND NATURAL GAS PRICES

8.1 Literature and Discussion

This section is entirely concerned with the relationships between downstream taxes and subsidies on petroleum products and crude oil prices. The fact that downstream taxes / subsidies on natural gas are relatively insignificant means that we have not encountered any literature which addresses natural gas separately. The impact of downstream taxation on upstream natural gas prices would therefore come via its impact on crude oil or oil product prices (the oil price-gas price link). However, we shall look at the empirical relationship between downstream and upstream natural gas prices in Chapter 8.2.

8.1.1. Downstream Taxes and Upstream Oil Prices

A priori it would seem that there can be no direct relationship between downstream taxes on petroleum products and upstream oil and gas prices. The latter are set in a market quite separate from downstream markets and whether or not one considers the agents in the upstream markets are price makers or price takers there is no direct link with e.g. the market relating refinery producers with wholesale and retail petroleum product sellers. On the other hand it is reasonable to assume that an *indirect link* may exist. If increased downstream taxation increases the price of petroleum products this could reduce the demand for those products and hence the derived demand for upstream oil and gas with a consequent fall in upstream prices. In terms of the simple supply and demand model:

Figure 27: The Impact of an Excise Tax on the Demand for Motor Fuel

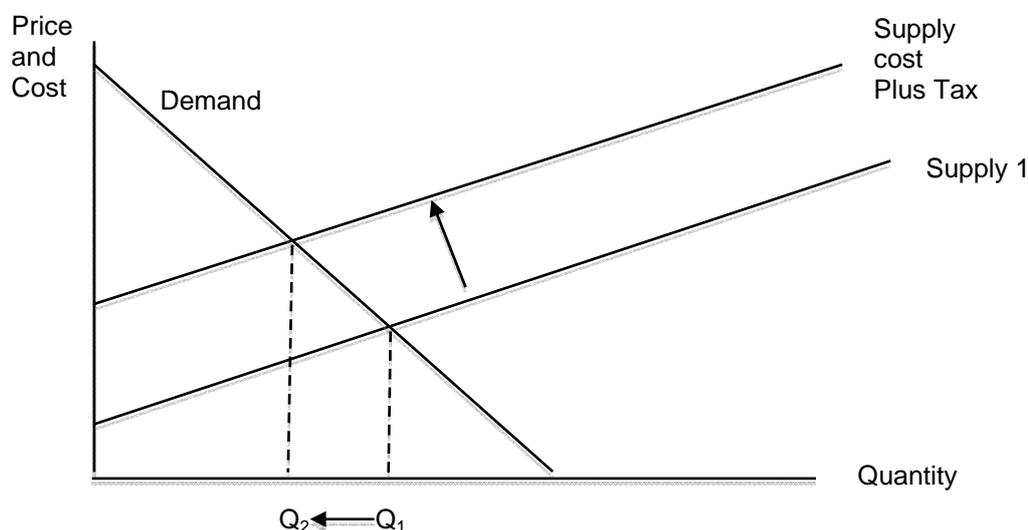
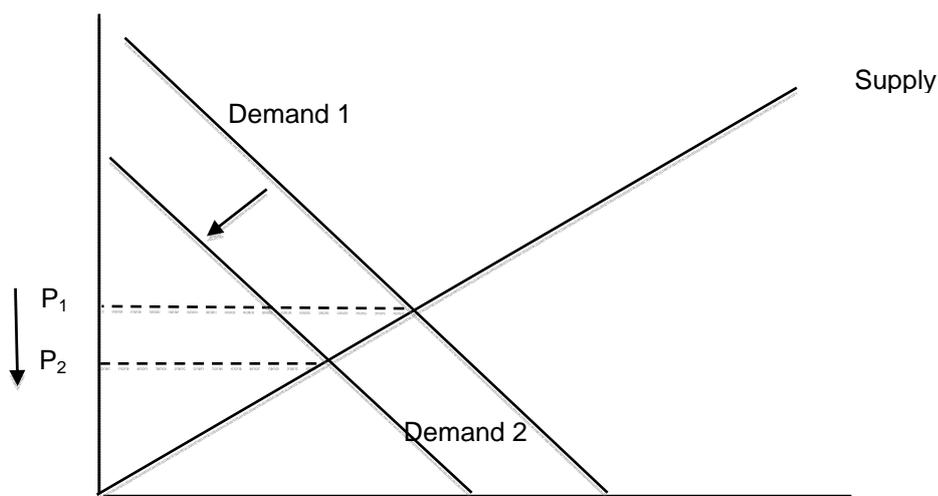


Figure 28: The Impact of a Fall in Demand for Motor fuel on the Price of Crude Oil



Note: The fall in demand for motor fuel in Figure 27, $Q_1 - Q_2$ is reflected in an inward shift in the derived demand for crude from Demand 1 to Demand 2 in Figure 28 and a consequent fall in the price of crude from P_1 to P_2 .

In fact a substantial number of academic studies, while not explicitly concerned with the impact of downstream taxation on crude prices have produced results from which such a negative relationship can be reasonably inferred. For example Sterner (2007), whose primary concern is the impact of taxation on hydrocarbon-related atmospheric pollution, concedes that although most motor fuel taxes were not originally implemented with a view to improving the environment, their *actual* outcome has, fortuitously, been to do just that via a substantial reduction of oil consumption below the level which would have pertained in the absence of such taxes,

To support his argument he carries out a counter-factual study in which he calculates the quantity of motor gasoline vehicle fuel (and hence emissions) which would have been ‘saved’ if all OECD countries were to adopt the highest motor gasoline taxes in Europe (those of the Netherlands). Sterner’s argument begins with a simple algebraic model of world demand for gasoline where, like all products, we assume that the demand Q depends on a constant c , price P and income Y plus an error term e . In natural numbers this is:

$$(1) \quad Q_{it} = cP_{it}^a Y_{it}^b e_{it}^c$$

where the subscripts i and t represent, respectively the individual country and the time period.

Sterner then points out for time series models it is common to use a so-called lagged endogenous model,

$$2) \quad Q_{it} = cP_{it}^a Y_{it}^b Q_{it-1}^c e_{it}^d$$

where the variable Q_{it-1}^c can be seen as the inertia in the system and it is easy to show that this equation is an alternative representation of a model in which fuel consumption also depends on a large number of geometrically declining lags of the exogenous variables P and Y .⁴³

He then posits an alternative expression in which the actual prices (including actual taxes) are replaced by the prices (including taxes) which would prevail in the hypothetical case where all gasoline taxes were raised to the Netherlands level.

$$3) \quad Q^{**} = cP^{**a}_{it} Y^b_{it} Q^c_{it-1} e^d_{it}$$

where Q^{**} and P^{**} represent the new, hypothetical values for Q and P . In Sterner's own words:

Consider a given country i , whose consumption of fuel Q_{it} is a response to prices and income P_{it} and Y_{it} . If the country instead had different taxes and thus prices P^{**} - not only today but sufficiently long for the demanded quantity to be in equilibrium, then that country's hypothetical demand Q^{**} would be given by the formula:

$$4) \quad Q^{**} = Q_{it} (P^{**}/P_{it})^a \quad (\text{Sterner, 2007, p.3197})^{44}$$

The crucial value here is the (long run) price elasticity of demand a for which Sterner selects a value of -0.8. Using equation (4) he then proceeds to calculate, for 12 OECD countries, the extent of the decline in fuel consumption (and hence demand for crude oil) were motor gasoline taxes raised to the Netherlands level. His conclusion is that raising taxes in this manner would result in a fall in gasoline consumption of around 270 million tonnes per year (approximately 5.5. million b/d). However, he also spells out the implication for oil prices.

'had the whole of Europe and Japan not taxed fuels, the aggregate demand would have been higher creating an upward pressure on world crude prices with unforeseeable effects.' (Sterner, 2007, p.3197n)

By implication, therefore, higher excise taxes on petroleum products means lower demand for those products, lower demand for crude and lower crude prices.

A number of other studies have argued that the imposition of excise taxes on petroleum products necessarily reduces oil demand and hence oil prices. Most of the recent literature on this subject is written in the context of proposals to implement a carbon tax (or emissions trading which would have a similar, but more reduced, effect). For example, Ghanem, Lounnas and Brennand (1999) calculated that the imposition of a carbon tax in three OECD regions (N. America, W. Europe and OECD Pacific) sufficient to reach their own Kyoto emissions targets (carbon taxes of \$67.9/tCO₂, \$128/t and \$94.3/t respectively) would reduce OPEC crude oil production by 2010 by 6.9 million b/d compared with a reference case, (from the reference case OPEC output of 39.6 mb/d in 2010 to 32.7 mb/d). It was assumed that the carbon tax would be revenue neutral and inflation neutral and that oil prices remained at

⁴³ This is often shown using the so-called Koyck transformation. See Gately and Huntington for an example using the logarithmic transformation used in econometric work (2002, p.30-31)

⁴⁴ In equilibrium we have three equations: (1) $Q_{it} = cP^a_{it} Y^b_{it} Q^c_{it-1} e^d_{it}$; (2) $Q^{**} = cP^{**a}_{it} Y^b_{it} Q^c_{it-1} e^d_{it}$; and (3) $Q_{it} = Q^{**}_{it}$. Dividing equation (2) by equation (1) we get: $Q^{**}/Q_{it} = (P^{**}/P_{it})^a$, hence $Q^{**} = Q_{it} (P^{**}/P_{it})^a$

reference case levels thereby implying that the fall in oil demand resulting from the tax is entirely absorbed by OPEC in the form of lower production. As a result annualised OPEC revenue (discounted at 5%) would fall by \$US 23.3 billion. Other studies go further. For example, Liski and Tahvonen (2004) conclude that by coordinating their carbon taxation policies the consuming countries can use a carbon tax ‘to reduce the producer price of fossil fuels and thereby shift resource rents from the resource-exporting countries.’ (Liski and Tahvonen, 2004, p.8) and writing on behalf of the Cooperation Council for the Arab States of the Gulf, Al-Abdallah (1999) also drew a pessimistic conclusion (from the oil producers perspective) as to the impact of a carbon tax upon producers output, prices and revenues. Indeed, another study (Van Muren et al. (2003) concludes that the Middle East would lose about 35 percent of its oil export revenue by 2050 if measures such as carbon taxes and emissions trading successfully stabilised atmospheric concentration of CO₂ at 450 ppm – a conclusion which clearly has less significance in the light of the levels which prices and revenues have been reaching in 2008.

However, returning to the *OPEC Review* study, its authors believed the probability of a scenario in which all the Annex 1 countries fully and immediately acted to meet their Kyoto emission targets was very low and investigated a number of alternative scenarios including full worldwide emissions trading and the adoption of the Clean Development Mechanism (CDM) involving the developing countries. The consequence of introducing these other mechanisms for CO₂ reduction substantially reduces the implicit carbon tax required to meet Kyoto objectives and in the Kyoto + CDM scenario the implied average carbon tax falls to just \$15/t CO₂, demand for OPEC oil falls by 3.3 mb/d compared with the reference case and OPEC revenue declines by \$11.7 billion. (Ghanem, Lounnas and Brennan, 1999, p.96).

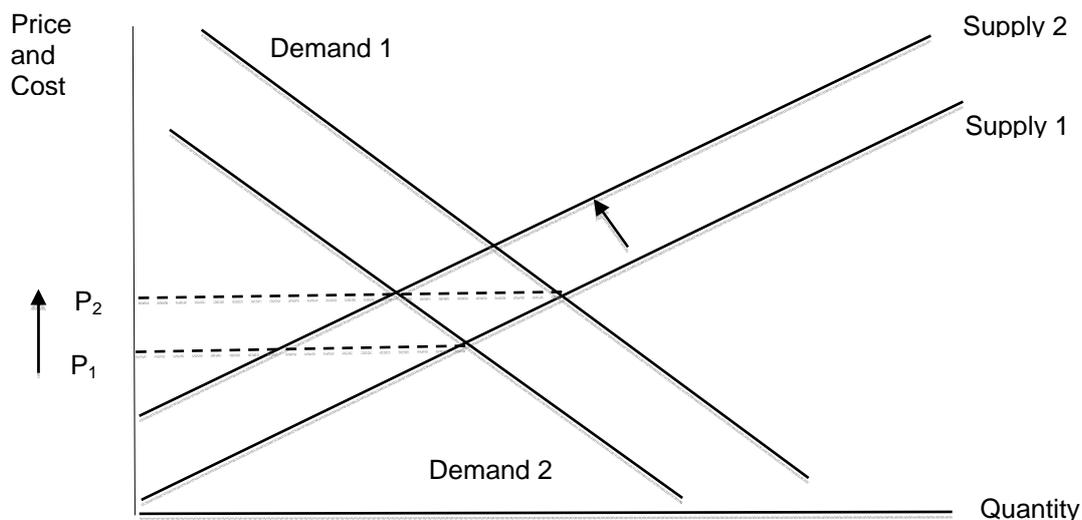
Nevertheless, even in this most ‘optimistic’ scenario, OPEC revenue losses are substantial. The authors of the *OPEC Review* study therefore examined another scenario in which the OPEC countries maintained their reference case revenues in the face of the kind of carbon tax / emission trading scenarios describe above by production restraint such that the crude price is maintained at sufficiently high levels to generate the same cumulative export revenue by the year 2010 as in the reference case.

Before we look at their conclusions, it is interesting to note that a similar response to a carbon tax has been suggested by Radetzky (2002). The intention of his paper is,

To explore the extent to which 2010 producer prices (before taxes and levies) of coal, oil and gas are likely to deviate from business as usual (BAU) price forecasts, when a climate change policy like that envisaged in the Kyoto agreement is carried out. (Radetzki, 2002, p.357)

In the case of oil, Radetzki argues that in the face of an environmental tax-induced fall in demand for oil and consequent fall in price as described in Figure 28 above, producers would simply reduce supply from Supply 1 to Supply 2 as illustrated in Figure 29 by cancelling new projects and allowing existing ones to deplete without further enhanced recovery methods. Thus the industry supply schedule would shift to the left and pre-tax prices would be restored from P₁ to P₂ as illustrated.

Figure 29: Oil Producers: Response to a Tax-induced Fall in demand for Crude Oil



Nevertheless, Ghanem et al. are much less sanguine about OPEC’s ability to restrain production to the degree required to return the oil prices and revenues to pre-carbon tax levels. Their simulation of such a strategy (bearing in mind that they were writing in 1999) showed that,

In order to retain medium-term revenue flows at reference case levels, OPEC production must fall to below 1995 levels and remain approximately flat for around five years, followed by only a gradual increase that leaves output in 2010 at 29 mb/d, similar to current levels ... However this scenario clearly stretches the boundaries of feasibility, with such a production profile almost certainly inconsistent with current and planned investment in production capacity (Ghanem et al. 1999, p.103-104)

However, noting that whereas non-OPEC oil producers benefit as ‘free-riders’ when OPEC strategy ensures firm prices but also suffer along with OPEC when the oil price falls, Ghanem et al. considered the possibility that OPEC’s burden of production restraint would be significantly reduced if non-OPEC producers joined in. ‘If oil prices are weak as a result of a carbon tax ... This may provide the incentive for non-OPEC to exercise production restraint together with OPEC.’ (Ghanem et al. p.105). Indeed this is precisely what happened in 1998-99 when oil prices fell for other reasons (the Far-East Economic Crisis and an ill-judged increase in OPEC production).

Another dissident view as to the impact of a carbon tax (or similar measure) on the price and revenues of oil producing countries (Perssson, Azar, Johansson & Lindgren, 2007) argues as follows. Current conventional oil reserves correspond to only a quarter of the acceptable ‘emission space’ over the next 100 years. Current reserves amount to around 1,150 Billion barrels equivalent to 140 Gt (gigatonnes) of carbon. If we stabilise the concentration of CO₂ in the atmosphere at 450 ppm, then we may emit 600 Gt carbon⁴⁵ over the next 100 years. However, given that most conventional oil is inexpensive to extract (a few dollars per barrel or less in the Middle East) and that oil is superior in the transport sector with few real contenders, most – if not all – of the current reserves will eventually be used up even if we opt for low stabilisation rates (450 ppm of CO₂ or even below). It is therefore likely that over

⁴⁵ 1 t of Carbon corresponds to 44/12 = 3.67 t of CO₂

time significant amounts of heavy non-conventional oil and coal-to-oil fuels will have to be used. Carbon emissions from heavy oil and synthetic oil are higher than gasoline and diesel based on conventional oil (for synthetic diesel from coal the emission factor is roughly twice as high as for diesel based on conventional oil) therefore a carbon tax or cap-and-trade mechanism will raise the cost of heavy oils and synthetic diesel from coal more than the corresponding increase in the cost of gasoline and diesel from conventional oil. So if these heavy fossil fuels set the price on liquid fuels the price gap will increase and conventional oil producers may receive a higher price if there is a carbon tax. This argument is tested against a number of different scenarios and whereas the authors do not conclude that OPEC and other major oil producers will *necessarily* gain in a carbon-constrained world, they present a strong case that under certain conditions (some realistic, some not so) demand for conventional oil and its real price will increase.

Before we attempt to draw any general conclusions about the causal relationship between downstream taxes and upstream hydrocarbon prices, it is important to examine an interesting paradox concerning the relationship between downstream taxes and the price elasticity of demand for crude oil. This is an important question because almost all economists in oil consuming countries agree that increasing the cross elasticity of demand for crude (principally by increasing the range of substitutes for crude) is the key to mitigating the economic damage cause by oil price volatility.

Let us assume for a moment that the imposition of an excise tax on petroleum products such as motor gasoline does, in fact, lead to a once-and-for-all fall in the demand for crude. The question then arises what will be the price elasticity of demand for crude in future years where, for example, a tightening of the oil supply / demand balance occurs resulting in an increase in the price of crude. The answer is that an oil-consuming country which has imposed a substantial excise tax on petroleum products is likely to be less demand responsive to an increase in the crude price than it was before the imposition of the excise tax and similarly, a country with low or negligible downstream taxes will be much more demand responsive to a sudden increase in the crude price than a country with substantial downstream petroleum taxes. In short, in a world where most countries have imposed substantial downstream excise taxes on petroleum products, an increase in crude prices will have a much smaller impact on the demand for the petroleum product (and hence the derived demand for crude) than in a world with low or negligible downstream taxes. And if the oil producers enjoy market power such that they can push up the price of crude, in a heavily-taxed world market for petroleum products they will be able to do so without much fear of losing demand for their product.

Algebraically, the relationship between the elasticity of demand for crude ϵ_c and the elasticity of demand for the taxed downstream petroleum product ϵ_p can be expressed as:

$$\epsilon_c = \epsilon_p \times \frac{P_c}{P_p} \times \frac{\Delta P_p}{\Delta P_c} \quad \text{where } P_c \text{ is the crude price and } P_p \text{ is the tax-inclusive}$$

$$P_p \quad \Delta P_c \quad \text{product price (Newbery, 2005, p.15)}$$

For example, for a time period t , if the value of $\Delta P_p / \Delta P_c$ is 0.5 and the average value of P_c / P_p over the time period t is 0.52, then $\epsilon_c = 0.26 \times \epsilon_p$. In other words, the price elasticity of demand for crude is only about a quarter of the price elasticity of demand for the taxed petroleum product.

In practice what this means is that a given increase in the price of crude will have a lower impact on the demand for petroleum products (and hence the derived demand for crude) in

countries with higher excise taxes than in countries with lower excise taxes. If we ignore refining costs and assume that a gallon of untaxed motor fuel costs the same as a gallon of crude, then as Fulton and Noland (2007) demonstrate, a 50 percent increase in the price of crude would result in a 40 percent increase in the retail fuel price when the excise tax is 20 per cent of the retail price, but only a 10 percent increase in the retail price when the excise tax is 80 percent of the retail price. With respect to the impact on demand for motor fuel (and hence crude), as Table 4 indicates, the higher the proportion of the retail fuel price which is constituted by the excise tax, the lower is the impact of a 50 percent crude price increase on the demand for fuel.

Table 5: Impact of 50 percent Increase in the Price of Crude Oil

(based upon demand for a taxed petroleum product under different excise tax proportions and an assumed price elasticity of demand for the petroleum product of -0.2)

Excise Tax as % of retail product price	Change in retail product price	Change in Demand for product
20%	+ 40%	- 8%
40%	+ 30%	- 6%
60%	+ 20%	- 4%
80%	+10%	- 2%

Source: Fulton & Noland, 2007, p.xiv

Note: The assumption on which this table and the above argument is based, is that the tax on the petroleum product is a (specific) excise tax. If, instead, the tax were *ad valorem*, then the tax would increase in the same proportion as the underlying fuel price and the impact on the final price and demand would be the same regardless of the level of the tax.

Thus, in Table 4, with a 60% tax share in the product price, if (as assumed) $dP_c/P_c = +0.5$ then $dP_p/P_p = + 0.2$, and with $\epsilon_p = - 0.2$, $dQ_p/Q_p = - 0.04$. However calculating the percentage change in consumption of the taxed petroleum product divided by the percentage change in the *crude* price gives us: $-0.04/0.5 = -0.08$. With the 60 per cent excise tax, the price elasticity of demand for crude (-0.08) is 2.5 times lower than the price elasticity of demand for the petroleum product (-0.2).

Concluding this section on the literature relevant to the relationship between downstream taxation of petroleum products and upstream oil prices the following possibilities suggest themselves:

- i. An increase in downstream taxes causes (directly or indirectly) a fall in upstream prices.
- ii. A reduction in downstream taxes causes (directly or indirectly) an increase in upstream prices.
- iii. An increase in upstream prices causes (directly or indirectly) a fall in downstream taxes.
- iv. A reduction in upstream prices causes (directly or indirectly) an increase downstream taxes.

With regard to (i) there is a substantial body of theory which supports the view that the application of an excise tax on oil products – for whatever reason - is likely to reduce demand for crude oil and hence its price. There are, however, as we have seen, some dissident voices with respect to the specific case of a carbon tax. Moreover, we may anticipate that the revelations about the relationship between demand and prices which are being generated by the recent rapid and dramatic escalation in crude oil prices will serve to modify the majority view.

That a reduction in downstream taxes might cause an increase in upstream prices (case ii) is a proposition which had recently become popular among some economists and financial journalists. For example, De Santis, (2003) concluded from a study of Saudi Arabia's oil policy that, 'If ...OECD countries accept to reduce the tax rate ... to ease the protests of local citizens, then the crude oil prices would further increase because lower taxation is an additional positive demand shock.' (De Santis, 2003, p.171). And more recently, Andrew Hill (2008) writing in the Financial Times has argued that if governments of oil consuming nations reduced excise taxes 'they would play into the hands of the biggest oil producing countries ... Cutting taxes would invite those countries to raise underlying prices.'

All one can say about this general argument is that whereas the De Santis version seems reasonable *a priori*, to the best of our knowledge there is no empirical evidence to support it. We do not observe in any country or in any historical period the phenomenon of a reduction in excise taxes being followed by an increase in crude prices. In fact, as we conclude below with reference to cases (iii) and (iv) the only relevant empirical evidence points in the *opposite* direction. In the Hill version, the implication is that OPEC would *actively* raise prices following a reduction in excise taxes in the major oil consuming countries. Putting aside the issue of whether or not OPEC has the power to do this, it is difficult to see any rational reason *why* they should wish to do this, (they might wish prices to be raised for other reasons but why this one?).

Turning to cases (iii) and (iv) we are on safer ground. To repeat the conclusion of the study by Goel and Nelson (1999), in the case of the world's largest oil consumer, the USA, there is clear evidence of a 'politically expedient negative relationship between [crude] prices and gasoline taxes.' As the crude price (and hence the price of refined products) increased, excise taxes were reduced, and *visa-versa*. Similarly we have seen that it was in an environment of extremely low upstream prices that governments like the UK were emboldened to increase excise taxes downstream, but that increasing upstream prices since 1998 have seen a relative decline in the importance of downstream taxes in the UK's oil chain (see Table 3 above).

8.1.2. Downstream Subsidies and Upstream Oil Prices

A priori we should expect that government subsidies on petroleum products like motor gasoline would increase the derived demand for crude and hence its price. In short, the argument is the mirror image of the taxation-effect argument discussed above. One important piece of literature on the relationship between subsidies and energy consumption is the IEA (1999) study briefly referred to in Chapter 6.4 above.⁴⁶ The study begins by defining an 'unsubsidised' 'reference price' as the opportunity cost of one unit of energy, (IEA, 1999, p.72).

⁴⁶ The IEA study is concerned with the subsidisation of all energy products, not just oil however, by implication, its methodology is relevant to a discussion of subsidised petroleum products.

Specifically, the IEA defines the opportunity cost for an energy exporting country as the f.o.b. price; for an energy importing country, the c.i.f. price; and for non-traded energy commodities it is the cost of production, itself defined as the short-run average cost (IEA, 1999, p.77). All three categories should also be adjusted for distribution costs and VAT.

Consequently, the IEA derives the formula for calculating the reduction in demand ΔQ which would follow from a switch to the unsubsidised 'reference prices' as follows:

$$\text{Since price elasticity is defined as } \epsilon = - \frac{P}{Q} \times \frac{\Delta Q}{\Delta P}$$

and in this case ΔP , the 'price gap' is $P_m - P_s$, the market, 'reference' price minus the subsidised price and $\Delta Q = Q_s - Q_m$ where Q_s is the subsidised quantity produced and consumed and Q_m is the unsubsidised 'market' quantity, then ΔQ , the quantity change in response to the removal of the 'price gap', is:

$$\Delta Q = \epsilon \times \frac{\Delta P}{P_s} \times Q_s$$

Using a logarithmic transformation of this expression and assuming a constant elasticity demand schedule of the form $Q = P^a$ where $a = \epsilon < 0$,⁴⁷ an econometric study was carried out for eight individual countries (China, Russian Federation, India, Indonesia, Iran, South Africa and Venezuela) where energy consumption was held to be heavily subsidised. The study concluded that the withdrawal of subsidies would result in an overall 12.8 percent reduction in energy consumption in the eight countries in question (IEA, 1999, p.64). By inference we might conclude that this would result in some decline in world energy prices.

However, in addition to problems relating to the definition of a 'reference price' for an energy commodity mentioned in Chapter 6.4, this approach ignores a number of specificities which could conceivably affect the scale and even the direction of a the *ceteris paribus*, relationship between subsidy withdrawal, demand contraction and oil price reduction.

Firstly, and to be consistent, if subsidies 'distort' the market (and this is the general message of the available literature on the subject), then so do taxes. And the OECD countries where taxation rather than subsidies prevail still dominate world consumption of hydrocarbons (58% of oil and 50% of natural gas), such that the demand-reducing effect of taxation probably has a greater weight in world hydrocarbon consumption than the demand-increasing effect of 'subsidies'. It is essentially arbitrary to pick out subsidies for attention – a more interesting question is whether the net effect of both taxes and subsidies on hydrocarbon consumption and prices is close to zero or not.

Secondly, a distinction needs to be made between countries for which 'subsidies' involve a cash cost and countries for which it simply involves an opportunity cost. The former are the poorer oil importing countries where large proportions of the population simply could not live with world market prices. These countries, particularly China, India and Indonesia which have

⁴⁷ That a demand schedule of the form $Q = P^a$ (where a is a constant) has a constant elasticity of demand can be demonstrated by elementary calculus as follows: If $Q = P^a$ then $\epsilon = P/Q \cdot dQ/dP$; $= P/Q \cdot aP^{a-1}$; substituting for Q , $\epsilon = P/P^a \cdot aP^{a-1}$ and therefore $\epsilon = a \cdot P^a / P^a = a$ (the constant).

a combined population of 2.6 billion (World Bank 2008), 40% of the world's population, are particularly significant because they are also the countries which have been driving recent increases in world consumption. As the Financial Times noted recently (20/6/2008):

Together, countries that subsidise fuel account for half of the world's population and a quarter of the world's fuel use. More importantly in terms of price, the countries that subsidise their fuel account for 100 per cent of current demand growth, because demand in developed regions such as the US, Europe and Japan is either flat or contracting.

However, the fact that subsidies in these countries involve a cash cost means that their withdrawal may simply allow increased expenditure in another domain without, therefore, any necessary reduction in the overall level of aggregate demand. The issue in question then reduces itself to whether, without fuel subsidies, these countries would not have grown as fast and placed such high demand on world crude oil supplies. This is clearly an immensely complex counter-factual question, the answer to which may best be found in watching how demand in these countries responds to the reductions in subsidies which are being forced on governments as the exchequer costs of mounting crude oil prices becomes intolerable. The early indications are apparently counter-intuitive as reductions in subsidies appear to have increased rather than reduced the demand for gasoline in China: the price control regime had caused shortages as refiners have incurred large losses – higher prices may well resolve the refining bottleneck (Financial Times, 20/6/08). But is this really counter-intuitive? As Morgan and Emoto point out (2007, p.xxii),

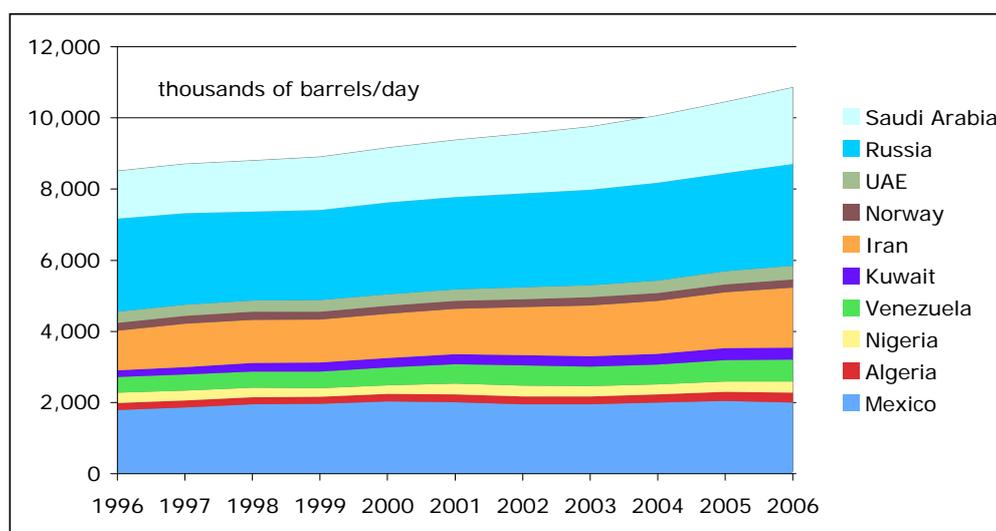
Income remains the primary driver of demand for oil, gas, coal and electricity – demand which has continued to grow strongly, with incomes, in most regions. Prices still affect demand, albeit proportionately less than income and in a more gradual fashion. As a result, the impact of recent higher prices on demand has been partly disguised by the impact of the surge in economic growth.

Moreover, 'the recent higher prices' referred to by these authors were only a foretaste of the current 'recent higher prices' which have in turn cast serious doubt over any sort of demand projection based on past price elasticities – the price elasticity of demand for hydrocarbons is showing signs of being continuously dynamic in the direction of zero (completely inelastic).

The countries for which hydrocarbon subsidies (lower than world market prices) represent an opportunity cost rather than a cash cost are the major producing / exporting countries which introduces a different specificity into the relationship between subsidies and world market prices. While in most of these countries domestic oil and gas prices can be very low without falling below the cost of production, and clearly stimulate consumption to levels above what it would otherwise be, this effect also contains the potential to affect world market prices by reducing surpluses available for export. The importance of this effect may be approximately assessed by considering the growth of domestic consumption in the top ten oil and gas exporting countries which are responsible for about three quarters of world exports of both crude oil and gas (pipeline and LNG).⁴⁸

⁴⁸ While world production of oil and gas is a relatively accessible figure, world export data is much more problematic. First of all, it has to be distinguished from 'trade' (because many countries export and then import to achieve a desired portfolio of products). Secondly, estimates of net exports can be divergent as BP for example excludes intra-regional exports of oil from its global data. Our estimate uses the latest world data from the EIA. However, while the gas data is consistent – relating the top ten gas exporters to world gas exports in 2004 – the oil data relates the top ten exporters in 2006 to world oil exports in 2004. In other words, it is relatively easy to obtain export data for the top exporting countries, but the data for the whole world emerges with a considerable lag.

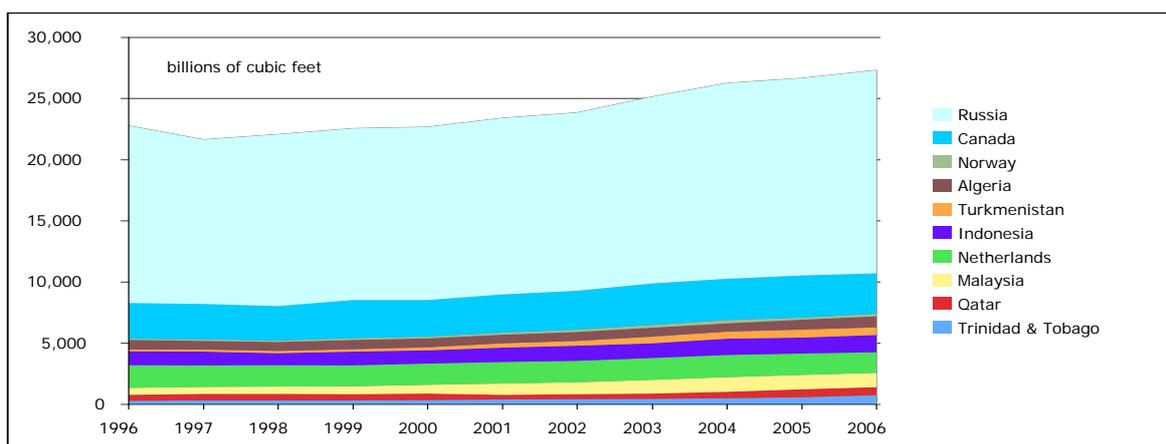
Figure 30: Domestic Consumption of Top 10 Oil Exporting Countries 1996-2006



Source: derived from EIA data

Figure 30 shows that the domestic consumption of the top ten oil exporting countries grew by 2.3 million barrels/day or 28% between 1996 and 2006. This constitutes 2.8% of world oil demand in 2006 and compares with an 18% increase in total world oil consumption between 1996 and 2006. Even if it were the case that all of the more rapid increase in consumption in these key countries were due to pricing below world market prices (which it is not e.g. population and income growth is a major influence), the impact on world demand would be less than a million barrels a day. Given the current lack of significant spare capacity in world oil markets, this could be viewed as significant. However, it would be an unjustified leap to blame the domestic consumption of oil producing countries for the current high price of oil.

Figure 31: Domestic Consumption of Top Ten Gas Exporting Countries 1996-2006



Source: derived from EIA data

Figure 31 shows the domestic gas consumption of the top ten gas exporters increasing by 4,523 billion cubic feet or 20% between 1996 and 2006. This constituted 4.3% of world gas consumption in 2006 and therefore seems to assume greater significance for world markets than does domestic consumption by the top ten oil producers. However, world gas consumption during this period grew by 28%, such that the exporting countries emerge as relatively restrained despite the lower than world market prices enjoyed by consumers in Russia for example. In fact this could even be taken to suggest that the domestic pricing of

gas below prices applying in international trade actually has positive benefit for world price levels: it may encourage producers to place more of their output on the world market because of the higher returns which such exports realise compared with lower-priced domestic sales. Indeed, being able to operate a dual pricing system which distinguishes between domestic and international sales may be a function of the level of more lucrative international sales.

8.2 Some Empirical Evidence

In this section we address the emerging relationship between crude oil prices and downstream taxes, in which the direction of causality goes from upstream prices to downstream taxes and not vice-versa, with some more comprehensive data for three different oil chains. We shall also consider the relationships between the upstream and downstream in the pricing of natural gas. While a lack of accessible data makes a similar exercise with respect to subsidies impossible, we are able to suggest likely empirical relationships.

In what follows we have assembled data for three different oil chains back to 1998, when oil prices were at their lowest point, following them through as far as the currently available data will permit, over 10 years to 2007. The chains selected reflect a variety of import source portfolios so that we can judge whether there is an identifiable trend which clearly applies irrespective of the source of crude oil or the particularities of consuming country downstream taxation. Thus Germany is selected because Russia is its most important source of oil supply. Japan is selected because it draws on Middle East oil and the US is selected because it has constructed a diversified portfolio of oil imports encompassing Canadian supplies, Latin American supplies, Nigerian supplies and supplies from the Middle East. Germany has a high level of downstream taxation, Japan has an intermediate level and the United States a low level.

Figure 32: The Composition of the German Gasoline Chain 1998-2007

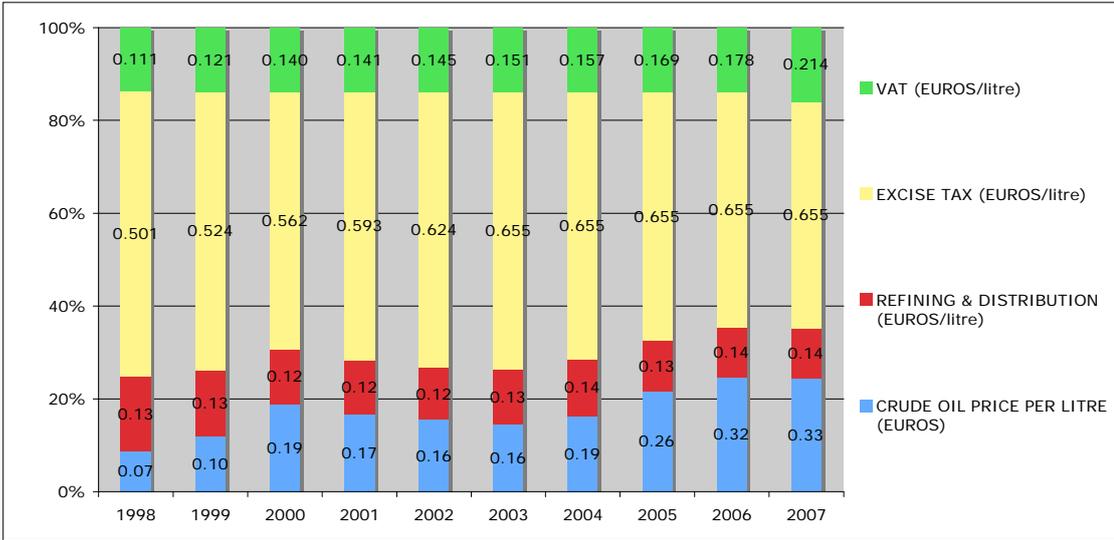


Figure 33: The Composition of the Japanese Gasoline Chain 1998-2007

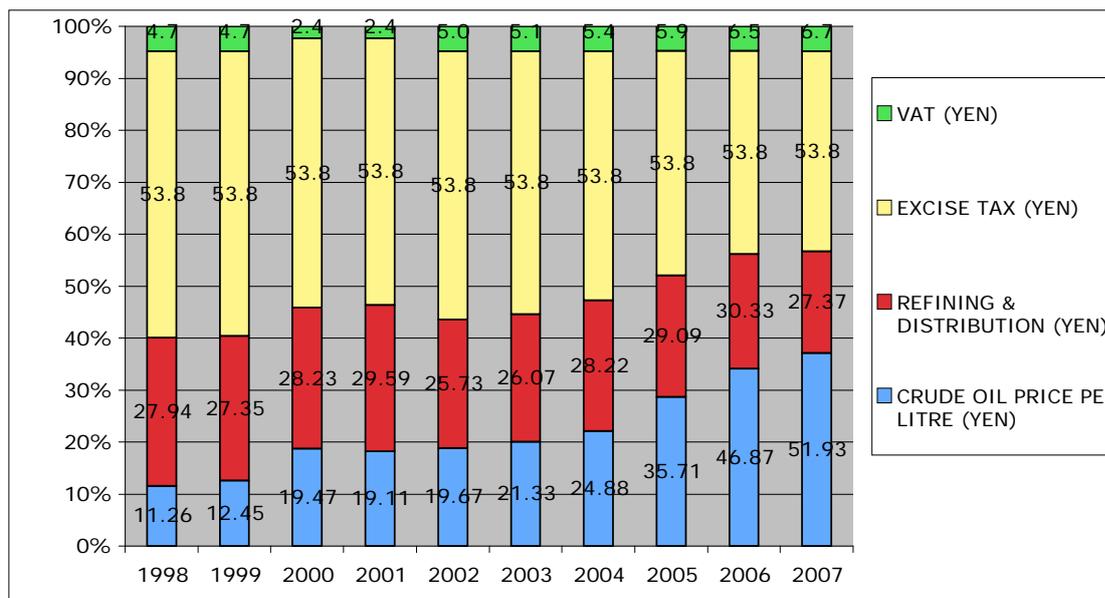
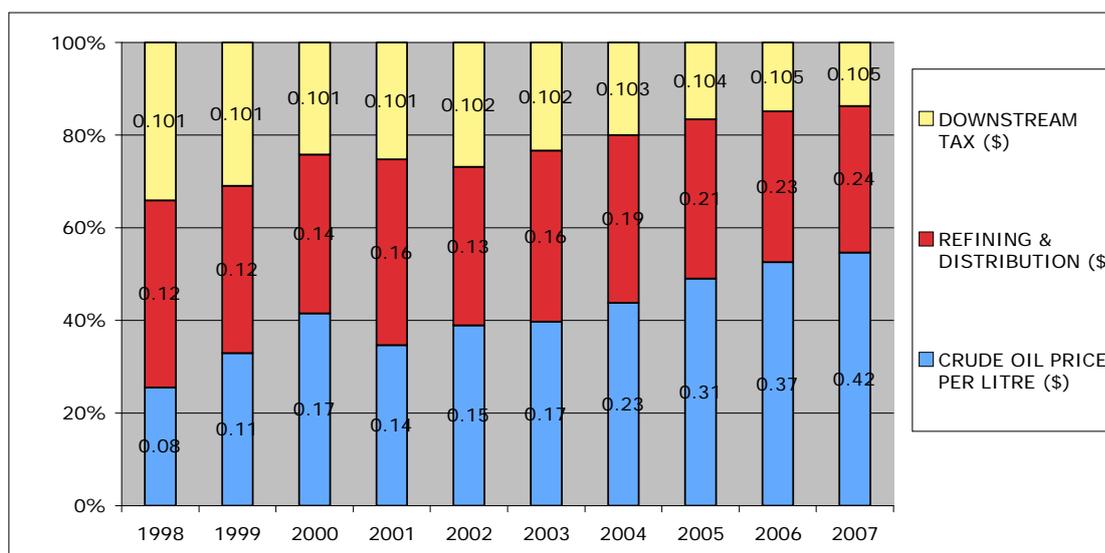


Figure 34: The Composition of the United States Gasoline Chain



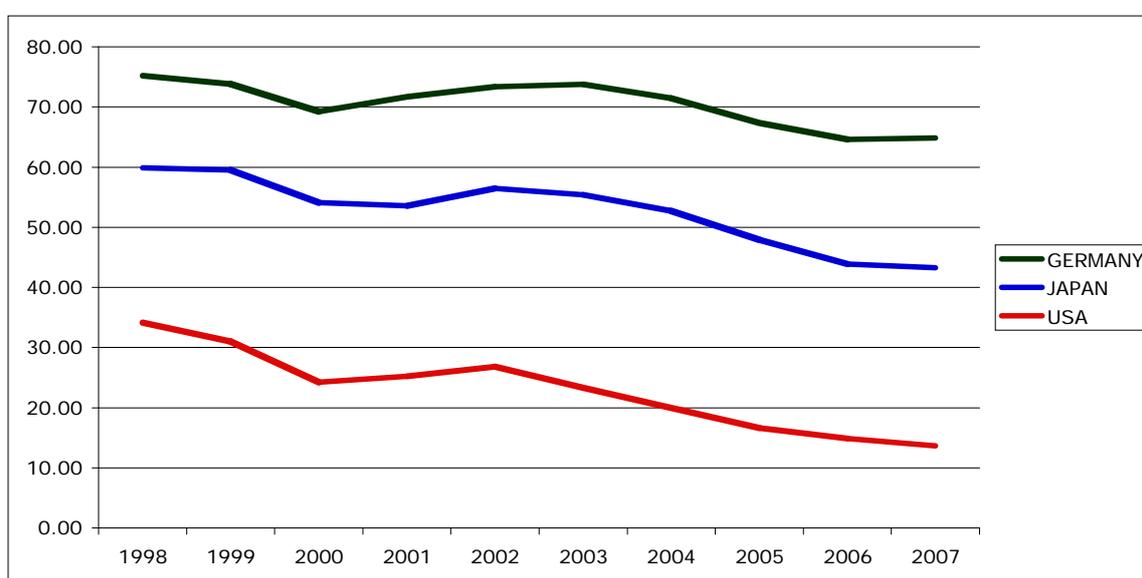
Sources: derived from IEA (2008)

Notes: (a) The crude oil component of each chain was derived by simply dividing the border import price (the CIF price) in national currency by the number of litres in a barrel. While this does not reflect the proportion of a barrel of crude which is refined into gasoline (it in effect assumes that all of the barrel is refined into gasoline when the actual proportion is less than half), there are two arguments for not attempting greater sophistication. Firstly, the rest of the barrel of crude is refined into other saleable products, albeit mainly of lesser value than gasoline. Secondly, even if a more sophisticated conversion factor were to be arrived at which reflected the weighted values of the refined products obtained from a barrel of crude, this would simply result in the same increase in crude oil cost per litre being applied to each year – and would not therefore change the trend – and it is the trend which we are interested in; (b) The Refining & Distribution margins were calculated as residuals; (c) the calculations were carried out using national currencies in order to avoid exchange rate effects; (d) 95 Ron gasoline prices were used in the cases of Germany and the United States; 91 Ron in the case of Japan because 95 Ron data is not available from the IEA.

Based on gasoline, each chain is decomposed into four major components: border import price in national currency, refining and distribution margins and downstream taxes. Excise taxes and VAT / Sales tax can be separately distinguished for Germany and Japan, but not for the USA. For each country, the charts show both the percentage breakdown of the gasoline chain and the actual absolute values of the components in national currency. From Figures 32, 33 and 34 a trend involving a lower share of downstream taxation in the gasoline chain as upstream prices rise is unmistakable – despite the fact that in Germany and Japan VAT / Sales tax tends to claim a higher share as the overall value of the gasoline chain increases. It is excise taxes which have taken the strain, having remained constant in absolute terms in Japan throughout the period, having been pegged at 0.655 Euro/litre in Germany since 2003 and having risen by only 4% over the whole period in the United States.

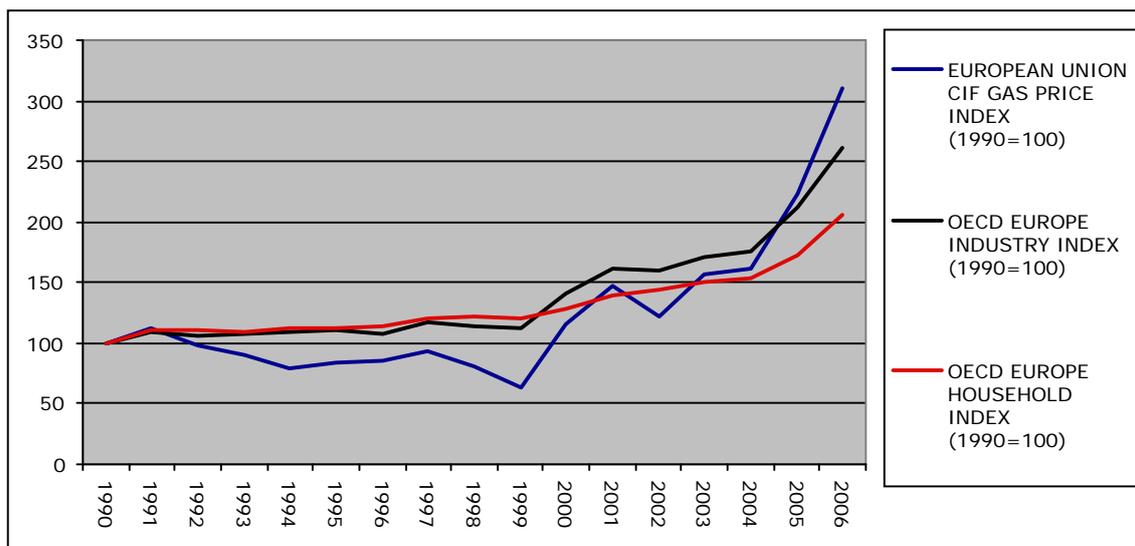
Figure 35 brings this trend into sharper relief by conveying just the percentage share of downstream taxes in the value of the gasoline chain in all three countries.

Figure 35: The Proportion of Downstream Taxes in the German, Japanese and United States Gasoline Chains 1998-2007



If this trend confirms that there exists a relationship between upstream crude oil prices and downstream taxes on gasoline, with latter as the dependent rather than independent variable, where does this leave natural gas? Clearly the downstream taxation of the natural gas chain is relatively insignificant compared with the taxation of the oil chain – a characteristic which will automatically enhance the importance of the upstream price and also of upstream taxation in the final price. However, it is worth briefly exploring whether the absence of significant downstream taxation of the natural gas chain has created space for downstream supply companies to draw rent in place of tax. If, moreover, such rents were being drawn by state companies this could be equivalent to tax revenue.

Figure 36: Relative Movements in Upstream and Downstream Gas Prices in Europe: 1990 to 2006



Source: BP(2007) and IEA (2008)

Note: the indices for prices to households and industry are nominal and include any taxes being applied to the gas chain

Figure 36 shows the relative movements of nominal European import prices (using the EU as proxy) with OECD nominal final prices to both industry and households. Bearing in mind that movements in final prices should always be less than movements in import prices depending on the proportion of the downstream price represented by upstream prices, Figure 36 does reveal a trend which is analogous to that of the oil chain. Firstly, as nominal import prices were broadly falling between 1991 and 1999, downstream prices were either increasing (for households) or relatively stable (industry) – indicating the creation of downstream rents. Subsequently, a squeeze on these rents is apparent as import prices rise. After 2004, the fact that import prices are rising more rapidly than either final prices to industry or to households is not evidence that gas is being sold to consumers at a loss, but it does indicate that the squeeze on downstream margins is increasing.

Finally, the above discussion has inevitably focused on taxes because, just as there is a limited literature analysing the impact of subsidies applied to the consumption of oil products and natural gas, so there is little empirical data with which to work. As Gupta et al. note (2003, p.383):

Petroleum product prices are often heavily regulated. Domestic price controls are prevalent, especially in countries that are net exporters of oil. Governments often keep prices well below international levels, resulting in the implicit subsidisation of oil consumption. However, as these subsidies are often not recorded in government budgets as expenditures, their economic cost, as well as the incidence on different income classes is often poorly understood. The lack of readily available estimates of the size of these implicit subsidies has thus precluded a fuller discussion of their costs and benefits.

What we can say though in the context of this discussion are two things. Firstly, we can anticipate the same inverse relationship between the upstream oil price and subsidies as we have seen exists for downstream taxation. However, whereas the taxation relationship required empirical demonstration, the inverse relationship between crude oil prices and

subsidies can be assumed to be automatic: as crude oil prices rise it is inconceivable that governments can continue to provide the same level of subsidy without a major impact on other areas of government expenditure. Increasing crude oil prices therefore almost compel reductions in subsidy – unlike the relationship between crude oil prices and downstream taxation which will tend to be ‘sticky downwards’ because governments will not wish to sacrifice the fiscal revenues represented by the downstream taxation of petroleum products.

Secondly, whereas any reduction in downstream taxation brought about by increasing crude oil prices will tend to increase or at least sustain the demand for oil, the consequences of reducing subsidies are more ambiguous. For example, even if a rise in oil prices does result in a reduction in the absolute level of subsidy (as opposed to simply reducing the proportion of subsidy in final price), this may well result in a corresponding increase in government expenditure on other goods and services - possibly leaving the change neutral with respect to the demand for oil and oil prices.

APPENDICES

APPENDIX A

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APPENDIX B

Abbreviations and Acronyms

bcm	billion cubic meters
b/d	barrels per day
BP	British Petroleum
BTU	British thermal unit
CTPA	Centre for Tax Policy and Administration (OECD)
CDM	clean development mechanism
CNPC	China National Petroleum Corporation
CO ₂	carbon dioxide
CVP	Corporacion Venezolana de Petroleo
DOE	Department of Energy (US)
Ecopetrol	Empresa Colombiana de Petroleos
EIA	Energy Information Administration (US)
EITI	Extractive Industries Transparency Initiative
ENI	Ente Nazionale Idrocarburi (Italy)
EU	European Union
FOB	free on board
GDP	gross domestic product
GHG	Greenhouse gases
GSP	government sales price
Gt	gigatonne
GTZ	Gesellschaft für Technische Zusammenarbeit
IEA	International Energy Agency
IOC	international oil company
IRR	internal rate of return
IRS	Internal Revenue Service (US)
ICSID	International Centre for Settlement of Investment Disputes
JOA	Joint Operating Agreement
JOGMEC	Japan Oil, Gas and Metal National Corporation
LIBOR	London inter-bank offer rate
LIFO	last-in-first-out
LNG	liquefied natural gas
LPG	liquefied petroleum gas
mb/d	million barrels per day
MET	mineral extraction tax (Russia)
MMS	Mineral Mining Service (US)
NIOC	National Iranian Oil Company
NNPC	Nigerian National Petroleum Corporation
NOC	national oil company
OCS	Outer Continental Shelf (US)

OECD	Organisation for Economic Co-operation and Development
OGJ	Oil and Gas Journal
OPEC	Organization of Petroleum Exporting Countries
PDVSA	Petroleos de Venezuela SA
PE	permanebt establishment
PEMEX	Petroleos Mexicanos
Petrobras	Petroleo Brasileiro
Petroecuador	Petroleos del Ecuador
PMC	private marginal cost
ppm	parts per million
PRT	petroleum revenue tax
PSA	production sharing agreement
PSC	production sharing contract
RON	research octane number
SDFI	State Direct Financial Interest (Norway)
Sinopec	China Petrochemical Corporation
SMC	social marginal cost
SPR	Strategic Petroleum Reserves (US)
UK	United Kingdom
US	United States
USA	United States of America
VAT	value added tax
YFP	Yacimientos Petroliferos Fiscales (Argentina)

APPENDIX C

UN Resolution No. 1803 (XVII) (1962) Permanent Sovereignty over Natural Resources

The General Assembly,

Recalling its resolutions 523 (VI) of 12 January 1952 and 626 (VII) of 21 December 1952,

Bearing in mind its resolution 1314 (XIII) of 12 December 1958, by which it established the Commission on Permanent Sovereignty over Natural Resources and instructed it to conduct a full survey of the status of permanent sovereignty over natural wealth and resources as a basic constituent of the right to self-determination, with recommendations, where necessary, for its strengthening, and decided further that, in the conduct of the full survey of the status of the permanent sovereignty of peoples and nations over their natural wealth and resources, due regard should be paid to the rights and duties of States under international law and to the importance of encouraging international co-operation in the economic development of developing countries,

Bearing in mind its resolution 1515 (XV) of 15 December 1960, in which it recommended that the sovereign right of every State to dispose of its wealth and its natural resources should be respected,

Considering that any measure in this respect must be based on the recognition of the inalienable right of all States freely to dispose of their natural wealth and resources in accordance with their national interests, and on respect for the economic independence of States,

Considering that nothing in paragraph 4 below in any way prejudices the position of any Member State on any aspect of the question of the rights and obligations of successor States and Governments in respect of property acquired before the accession to complete sovereignty of countries formerly under colonial rule,

Noting that the subject of succession of States and Governments is being examined as a matter of priority by the International Law Commission,

Considering that it is desirable to promote international co-operation for the economic development of developing countries, and that economic and financial agreements between the developed and the developing countries must be based on the principles of equality and of the right of peoples and nations to self-determination,

Considering that the provision of economic and technical assistance, loans and increased foreign investment must not be subject to conditions which conflict with the interests of the recipient State,

Considering the benefits to be derived from exchanges of technical and scientific information likely to promote the development and use of such resources and wealth, and the important part which the United Nations and other international organizations are called upon to play in that connexion,

Attaching particular importance to the question of promoting the economic development of developing countries and securing their economic independence,

Noting that the creation and strengthening of the inalienable sovereignty of States over their natural wealth and resources reinforces their economic independence,

Desiring that there should be further consideration by the United Nations of the subject of permanent sovereignty over natural resources in the spirit of international co-operation in the field of economic development, particularly that of the developing countries,

I

Declares that:

1. The right of peoples and nations to permanent sovereignty over their natural wealth and resources must be exercised in the interest of their national development and of the well-being of the people of the State concerned,
2. The exploration, development and disposition of such resources, as well as the import of the foreign capital required for these purposes, should be in conformity with the rules and conditions which the peoples and nations freely consider to be necessary or desirable with regard to the authorization, restriction or prohibition of such activities.
3. In cases where authorization is granted, the capital imported and the earnings on that capital shall be governed by the terms thereof, by the national legislation in force, and by international law. The profits derived must be shared in the proportions freely agreed upon, in each case, between the investors and the recipient State, due care being taken to ensure that there is no impairment, for any reason, of that State's sovereignty over its natural wealth and resources.
4. Nationalization, expropriation or requisitioning shall be based on grounds or reasons of public utility, security or the national interest which are recognized as overriding purely individual or private interests, both domestic and foreign. In such cases the owner shall be paid appropriate compensation, in accordance with the rules in force in the State taking such measures in the exercise of its sovereignty and in accordance with international law. In any case where the question of compensation gives rise to a controversy, the national jurisdiction of the State taking such measures shall be exhausted. However, upon agreement by sovereign States and other parties concerned, settlement of the dispute should be made through arbitration or international adjudication.
5. The free and beneficial exercise of the sovereignty of peoples and nations over their natural resources must be furthered by the mutual respect of States based on their sovereign equality.
6. International co-operation for the economic development of developing countries, whether in the form of public or private capital investments, exchange of goods and services, technical assistance, or exchange of scientific information, shall be such as to further their independent national development and shall be based upon respect for their sovereignty over their natural wealth and resources.
7. Violation of the rights of peoples and nations to sovereignty over their natural wealth and resources is contrary to the spirit and principles of the Charter of the United Nations and hinders the development of international co-operation and the maintenance of peace.

8. Foreign investment agreements freely entered into by or between sovereign States shall be observed in good faith; States and international organizations shall strictly and conscientiously respect the sovereignty of peoples and nations over their natural wealth and resources in accordance with the Charter and the principles set forth in the present resolution.

II

Welcomes the decision of the International Law Commission to speed up its work on the codification of the topic of responsibility of States for the consideration of the General Assembly; *

III

Requests the Secretary-General to continue the study of the various aspects of permanent sovereignty over natural resources, taking into account the desire of Member States to ensure the protection of their sovereign rights while encouraging international co-operation in the field of economic development, and to report to the Economic and Social Council and to the General Assembly, if possible at its eighteenth session.

1194th plenary meeting,
14 December 1962.

* *Official records of the General Assembly, Seventeenth Session, Supplement No. 9 (A/5209), paras. 67-69*

APPENDIX D

THE ENERGY CHARTER TREATY ARTICLE 18 SOVEREIGNTY OVER ENERGY RESOURCES

(1) The Contracting Parties recognize state sovereignty and sovereign rights over energy resources. They reaffirm that these must be exercised in accordance with and subject to the rules of international law.

(2) Without affecting the objectives of promoting access to energy resources, and exploration and development thereof on a commercial basis, the Treaty shall in no way prejudice the rules in Contracting Parties governing the system of property ownership of energy resources.

(3) Each state continues to hold in particular the rights to decide the geographical areas within its Area to be made available for exploration and development of its energy resources, the optimization of their recovery and the rate at which they may be depleted or otherwise exploited, to specify and enjoy any taxes, royalties or other financial payments payable by virtue of such exploration and exploitation, and to regulate the environmental and safety aspects of such exploration, development and reclamation within its Area, and to participate in such exploration and exploitation, inter alia, through direct participation by the government or through state enterprises.

(4) The Contracting Parties undertake to facilitate access to energy resources, inter alia, by allocating in a non-discriminatory manner on the basis of published criteria authorizations, licences, concessions and contracts to prospect and explore for or to exploit or extract energy resources.

APPENDIX E

ENERGY CHARTER TREATY ARTICLE 21 TAXATION

(1) Except as otherwise provided in this Article, nothing in this Treaty shall create rights or impose obligations with respect to Taxation Measures of the Contracting Parties. In the event of any inconsistency between this Article and any other provision of the Treaty, this Article shall prevail to the extent of the inconsistency.

(2) Article 7(3) shall apply to Taxation Measures other than those on income or on capital, except that such provision shall not apply to:

(a) an advantage accorded by a Contracting Party pursuant to the tax provisions of any convention, agreement or arrangement described in subparagraph (7)(a)(ii); or

(b) any Taxation Measure aimed at ensuring the effective collection of taxes, except where the measure of a Contracting Party arbitrarily discriminates against Energy Materials and Products originating in, or destined for the Area of another Contracting Party or arbitrarily restricts benefits accorded under Article 7(3).

(3) Article 10(2) and (7) shall apply to Taxation Measures of the Contracting Parties other than those on income or on capital, except that such provisions shall not apply to:

(a) impose most favoured nation obligations with respect to advantages accorded by a Contracting Party pursuant to the tax provisions of any convention, agreement or arrangement described in subparagraph (7)(a)(ii) or resulting from membership of any Regional Economic Integration Organization; or

(b) any Taxation Measure aimed at ensuring the effective collection of taxes, except where the measure arbitrarily discriminates against an Investor of another Contracting Party or arbitrarily restricts benefits accorded under the Investment provisions of this Treaty.

(4) Article 29(2) to (6) shall apply to Taxation Measures other than those on income or on capital.

(5) (a) Article 13 shall apply to taxes.

(b) Whenever an issue arises under Article 13, to the extent it pertains to whether a tax constitutes an expropriation or whether a tax alleged to constitute an expropriation is discriminatory, the following provisions shall apply:

(i) The Investor or the Contracting Party alleging expropriation shall refer the issue of whether the tax is an expropriation or whether the tax is discriminatory to the relevant Competent Tax Authority. Failing such referral by the Investor or the Contracting Party, bodies called upon to settle disputes pursuant to Article 26(2)(c) or 27(2) shall make a referral to the relevant Competent Tax Authorities;

(ii) The Competent Tax Authorities shall, within a period of six months of such referral, strive to resolve the issues so referred. Where non-discrimination issues are concerned, the Competent Tax Authorities shall apply the non-discrimination provisions of the relevant tax convention or, if there is no non-discrimination provision in the relevant tax convention applicable to the tax or no such tax convention is in force between the Contracting Parties concerned, they shall apply the non-discrimination principles under the Model Tax Convention on Income and Capital of the Organisation for Economic Co-operation and Development;

(iii) Bodies called upon to settle disputes pursuant to Article 26(2)(c) or 27(2) may take into account any conclusions arrived at by the Competent Tax Authorities regarding whether the tax is an expropriation. Such bodies shall take into account any conclusions arrived at within the six-month period prescribed in subparagraph (b)(ii) by the Competent Tax Authorities regarding whether the tax is discriminatory. Such bodies may also take into account any conclusions arrived at by the Competent Tax Authorities after the expiry of the six-month period;

(iv) Under no circumstances shall involvement of the Competent Tax Authorities, beyond the end of the six-month period referred to in subparagraph (b)(ii), lead to a delay of proceedings under Articles 26 and 27.

(6) For the avoidance of doubt, Article 14 shall not limit the right of a Contracting Party to impose or collect a tax by withholding or other means.

(7) For the purposes of this Article:

(a) The term “Taxation Measure” includes:

(i) any provision relating to taxes of the domestic law of the Contracting Party or of a political subdivision thereof or a local authority therein; and

(ii) any provision relating to taxes of any convention for the avoidance of double taxation or of any other international agreement or arrangement by which the Contracting Party is bound.

(b) There shall be regarded as taxes on income or on capital all taxes imposed on total income, on total capital or on elements of income or of capital, including taxes on gains from the alienation of property, taxes on estates, inheritances and gifts, or substantially similar taxes, taxes on the total amounts of wages or salaries paid by enterprises, as well as taxes on capital appreciation.

(c) A “Competent Tax Authority” means the competent authority pursuant to a double taxation agreement in force between the Contracting Parties or, when no such agreement is in force, the minister or ministry responsible for taxes or their authorized representatives.

(d) For the avoidance of doubt, the terms “tax provisions” and “taxes” do not include customs duties.

APPENDIX F

Iran's Buy Back Agreement (As of July 2008)

Date	Oil / gas field	investment	partner	note
July 1995	Sirri A / E	\$0.6 billion	Total* (France) 70%, Petronas 30%	* operator
September 1997	South Pars (Phase 2 / 3)	\$2 billion	Total* (France) 40%, Petronas (Malaysia) 30%, Gazprom (Russia) 30%	
March 1999	Doroud	\$0.54 billion	Total* (France) 55%, ENI (Italy) 45%	
April 1999	Balal	\$2.4 billion	Total* (France) 46.75%, ENI (Italy) 38.25%, Bow Valley (Canada) 15%	
November 1999	Soroosh / Nowrooz	\$0.78 billion	Shell* (Netherlands / UK) 70%, Japex (Japan) / Inpex (Japan) 20%, OIEC (Iran) 10%	
July 2000	South Pars (Phase 4 / 5)	\$1.9 billion	ENI* (Italy) 60%, Petronas (Malaysia) 20%, NIOC (Iran) 20%	
June 2001	Darquain	\$0.55 billion	ENI* (Italy) 60%, NIOC (Iran) 40%	
September 2002	South Pars (Phase 9 / 10)	\$1 billion	LG* (Korea) 48%, IOEC (Iran) / OIEC (Iran) 52%	
October 2002	South Pars (Phase 6 / 7 / 8)	\$3 billion	StatoilHydro* (Norway) 40%, Petropars (Iran) 60%	
February 2004	Azadegan	\$2 billion	NIOC* (Iran) 90%, Inpex (Japan) 10%	Inpex's share reduced from 75% to 10% in September 2006
December 2007	Yadavaran	\$2 billion	Sinopec* (China) 100%	

Source: JOGMEC

APPENDIX G

Fiscal Regime of Venezuelan Orinoco Extra-Heavy Oil Projects

	Sincor	Petrozuata	Hamaca	Cerro Negro
Contract form	Strategic association			
Partner	Total* 47%, PDVSA 38%, StatoilHydro 15%	ConocoPhillips* 50.1%, PDVSA 49.9%	ConocoPhillips* 40%, Chevron 30%, PDVSA 30%	ExxonMobil* 41.67%, PDVSA 41.67%, BP 16.66%
Royalty	1% for the initial eight years, then 16.67%			
Corporate tax	33.4%			
Block area (km ²)	500	275	650	300
Congressional approval	1993	1993	1997	1997
Capacity (b/d)	200,000	120,000	190,000	120,000
API gravity	8.0-8.5	9.3	8.7	8.5
Start of prod.	2000	1998	2001	1999
New name	Petro Cedeno	Petro Anzoategui	Petro Piar	Petro Monagas
New partner	PDVSA* 60%, Total 30.3%, StatoilHydro 9.7%	PDVSA* 100%	PDVSA* 70%, Chevron 30%	PDVSA* 83.3%, BP 16.7%
New royalty	33.3%			
New corp tax	50%			
New block area (km ²)	399	275	463	210
Other	\$1.1 billion paid to Total and StatoilHydro as compensation (media report)	ConocoPhillips decided to withdraw. Compensation under negotiation	Chevron accepted new conditions	ExxonMobil brought suits to ICSID, UK and US courts and others. BP accepted new conditions.

Note: * operator

Source: JOGMEC

APPENDIX H

DOWNSTREAM TAXATION OF PETROLEUM PRODUCTS & NATURAL GAS IN SELECTED ENERGY CHARTER COUNTRIES (2007)

		AUSTRALIA		JAPAN		NORWAY		RUSSIA		SPAIN		SWEDEN		TURKEY		UK	
per litre; per 10mkcal or %		AU\$	US\$	YEN	US\$	Kroner	US\$	Roubles	US\$	Euro	US\$	Krona	US\$	Lira	US\$	£	US\$
GASOLINE	EXCISE	0.38143	0.31919	55.84	0.47402	4.17	0.71185		0.1132	0.418	0.52251			1.363	1.04846	0.5035	1.007
VAT / SALES TAX	RATE	10%		5%		25%		20%		16%		25%		18%		17.50%	
VAT / SALES TAX	ACTUAL (2007)	0.117	0.09791	6.7	0.05688	2.337	0.39894	3.4	0.13292	0.143	0.16027	2.33	0.34478	0.439	0.33769	0.14	0.28
	ENERGY												0.74874				
	CO2					0.8	0.13657					5.06					
Excise + VAT+Energy / CO2	Household	0.49843	0.4171	62.54	0.5309		1.2474		0.2461		0.6828		1.0935	1.802	1.3862		1.287
DIESEL	EXCISE	0.38143	0.31919	34.14	0.28981	4.17	0.71185			0.32	0.52251			0.835	0.64231	0.5035	1.007
VAT / SALES TAX	RATE	10%		5%		25%		20%		16%		25%		18%		17.50%	
VAT / SALES TAX Households	ACTUAL (2007)	0.119	0.09958	4.1	0.0348	2.14	0.36531			0.132	0.16301	2.202	0.32584	0.351	0.27	0.144	0.288
	ENERGY												0.55046				
	CO2											3.72					
	OTHER ENV																
Excise + VAT	Non-Commercial	0.50043	0.4188	38.24	0.3246		1.0772				0.6855		0.8763	1.186	0.9123		1.295

Taxation along the oil and gas supply chain

		AUSTRALIA		JAPAN		NORWAY		RUSSIA		SPAIN		SWEDEN		TURKEY		UK	
per litre; per 10mkcal or %		AU\$	US\$	YEN	US\$	Kroner	US\$	Roubles	US\$	Euro	US\$	Krona	US\$	Lira	US\$	£	US\$
Non-VAT (except Japan)	Commercial		0.3192	37.24	0.3161		0.7118				0.5225		0.5505	0.835	0.6423		1.007
LIGHT FUEL OIL for INDUSTRY	EXCISE				0	0.429	0.07323			0.08471	0.11604					0.0969	0.1938
VAT / SALES TAX	RATE			5%		25%		20%		16%		25%					5%
VAT / SALES TAX	ACTUAL (2007)			2.855	0.02424												
	ENERGY												0.08272				
	CO2					0.54	0.09218					0.559					
	OTHER ENV					0.07	0.01195										
Non-VAT (except Japan)	Commercial			2.855	0.0242		0.1774				0.116		0.0827				0.1938
LOW SULPHUR FUEL OIL	EXCISE					0.429	0.07323			0.014	0.01918					0.08845	0.1769
VAT / SALES TAX	RATE			5%		25%		20%		16%		25%					17.50%
VAT / SALES TAX	ACTUAL (2007)			3219													
	ENERGY												0.51642				
	CO2					0.54	0.09218					3.49					
	OTHER ENV					0.07	0.01195										

Taxation along the oil and gas supply chain

		AUSTRALIA		JAPAN		NORWAY		RUSSIA		SPAIN		SWEDEN		TURKEY		UK	
per litre; per 10mkcal or %		AU\$	US\$	YEN	US\$	Kroner	US\$	Roubles	US\$	Euro	US\$	Krona	US\$	Lira	US\$	£	US\$
Non-VAT only in US\$	Commercial			3.0225	0.0257	1.039	0.1774				0.0192		0.5164				0.1769
NATURAL GAS	EXCISE	STATE-level		n/a		n/a				1.50%				23.3	17.9231		
	VAT / SALES TAX	10%		5%		25%		20%		16%		25%		18%		5.00%	
	ENERGY																
	CO2																

		AUSTRALIA		JAPAN		NORWAY		RUSSIA		SPAIN		SWEDEN		TURKEY		UK	
NOTES				VAT only applied to ex-Tax prices				VAT appears to be effective for both commercial diesel and natural gas for electricity generation	Excise tax rate of \$153 per tonne of gasoline converted to litres at a rate of 1,351 litres per tonne (the BP gasoline rate)	Excise tax on Natural Gas is the maximum municipal tax incorporated into the ex-tax price		The complexity of Sweden's taxes, which are now generally energy / CO2 taxes rather than excise duties, means that an aggregate rate has been taken.		Excise tax on Natural Gas is for Industry only			
NOTES				Includes Excise tax levied on refined crude oil						Excise taxes on gasoline and diesel include average regional taxes		Light Fuel Oil Excise is at the industrial rate which is only 16% of the rate applied to households					