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2. Preface

My attention was drawn to the European refining sector when the Austrian oil company OMV tried to take over the sole Hungarian one, MOL - an attempt that failed in 2008. After considering dropping the whole topic, I decided to stick to it and to write a study on the oil refining industry.

The industry finds itself at a confluence of economic forces, free competition and political interference. In addition to necessary changes in structure, output and technology, some firms in the industry are subject to political specifications. Politics claims to have an influence on the price of fuel, over and above collecting taxes, and to provide the ordinary citizen with affordable fossil fuels for heating and individual transport. Even the ownership structure of some companies is closely observed: Russian oil exploration companies want to enter the European retail markets, seeking to acquire shareholdings in companies already engaged in the retail of oil products. Following the gas conflicts between Russia and Ukraine or Belarus respectively, the reputation of Russian oil and gas companies has been tarnished as a result of their failure to guarantee supply to European countries. Some governments may even make political capital from pretending to ensure security of supply, retain “national champions” and safeguard employment at home.

All of these facts provide a wide field of activity for investigating the industry. This thesis shall come up with a general analysis of the European oil refining industry with a focus on six countries. The remit had to be restricted, as analysing Europe as a whole would no doubt have gone beyond the scope of this work. The analysis shall focus on Austria, Germany, Italy, the Czech Republic, Slovakia and Hungary – countries which constitute, at least partially, a common market in trade with refined products. The way in which crude oil and processed goods are transported and stored will be briefly looked at, because they put a constraint on options of firms engaged in or considering entering the industry.

An introduction into technical issues of oil refining will be featured together with chapters that try to combine known facts with facts deduced from theory. The aim is to outline the problems of the refining industry, the threats to effective competition and the challenges that are set to emerge in the near future.

3. Introduction

This thesis shall provide a review of the refining industry in a selection of countries in Central and Eastern Europe that constitute a common relevant geographic market.

The industry concerned is regarded being at a turning point. In some highly developed countries of the European Union, demand for oil products is believed to have already passed its peak and domestic markets often do not forecast significant growth, with the exception of Eastern European countries where motorised private transportation rises in tandem with growing prosperity. Fuel prices showing new all-time highs, though excessively taxed in many countries, give rise to cycling short distances or using public transport where available. Fuel-efficient diesel-driven cars become popular; the share of diesel consumption as a percentage of the total demand for motor fuel is on the rise, already amounting to over 50% in most European countries. In Austria the share of diesel used amounted to 76% in 2007, with the share in Italy, the Czech Republic, Slovakia and Hungary reaching over 60%, clearly indicating the rising demand for diesel fuel.

The soar in demand for diesel, as well for other low sulphuric products, requires investment in new technologies, so-called secondary capacities or conversion capacities, to increase the yield of those products at constant input. Implementing such conversion technology raises costs and, by extension, prices for refined products and this is not an easy task in an environment that is already quite sensitive due to volatile oil prices and heavy taxation.

The structure of the industry is dominated by large, highly vertically integrated firms that may also have advantages over smaller companies in purchasing crude oil or benefiting from economies of scale. Although some smaller national or regional champions prevail, there have already been many attempted mergers or takeovers with a view to grow and act as a counterweight to the multinational companies. Mergers do cause an increase in concentration in the market and may throw up issues like the probability of collusion, foreclosure and other suits for antitrust authorities. Environmental concerns, especially measures intended to reduce the emission of greenhouse gases, have resulted in governments issuing strict quality requirements for oil products. Furthermore, the refining industry in Europe suffers from overcapacity; setting up new plants, without closing older ones, can be considered unlikely. Oil exporting countries show large investment and are reckoned to be striving for a larger part of value added chain.

In this thesis I will analyze a well-defined common market, with respect to the relevant product and geographic market, to examine the industry structure and the competitive environment.

3.1. Glossary and list of abbreviations

AWP	Adria-Wien Pipeline
b/d	barrels per day
bbl, bbl/d	Barrel of 159 litres, the unit internationally used for the trade in oil. The conversion rate of thousand barrels/day to metric tons/year is: 1 bpd~> 49.8 tons[1] per year, sometimes it's found rounded up to 50.
boe, boe/d	Barrel of oil equivalents per day
Crude oil	Rid of light gases, crude oil ready for refining
EC	European Commission
ELG	Erdöl-Lagergesellschaft
IEA	International Energy Agency, founded after the first oil crisis to meet future challenges in energy supplies. IEA can be considered as an autonomous subdivision of OECD. Members are Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Korea, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, the Slovak Republic (since November 2007), Spain, Sweden, Switzerland, Turkey, the United Kingdom, the United States.
LPG	Liquefied Petrol Gas
m tons	Million tons
Downstream	Usually downstream activities of an oil company cover distribution, wholesale, retail (gas stations) of processed goods to consumers or intermediaries.
Midstream	The activities summed up by this term concern transporting crude oil and gas. This is about holding and managing pipeline systems in pipelines and vessels to the refining spots where the crude materials get processed.
Upstream[2]	This range of tasks in an oil company is not only just about drilling for oil/gas. It entails also contractual work, licensing and organizing joint ventures. Exploration and production of crude oil or natural gas or LNG (liquefied natural gas). This includes searching for oil/gas deposits, making agreements about rights to exploit those deposits. Further calculating the profitability of deposits considered for exploitation and in the end drilling for oil/gas and bringing it to

[1] According to the classification BP has made in its „Annual Report and Accounts 2007", but this classification is quite similar to other oil companies.
[2] BP „Statistical Review 2008"

	the surface. This clearly implies both, on- and offshore activities. Activities in the upstream section of a firm also embed managing the firm's reserves and production, the former is to ensure continuity of the latter. Estimating and categorizing the amounts of (proved or not proved) reserves is also a matter of controlling the production process as well as for book-keeping reasons and in the end for making sure the company gets its share from an equity shared reserve pool.
Primary distillation capacity	Gives nameplate capabilities of a refining unit in million tons per year or thousand barrels per day. Does not necessarily correspond to the real amounts of crude material fed into the process, because of stops of production. These stops may occur planned or unplanned, because of holidays or to perform maintenance work or security checks. Unplanned ceasing of production is quite costly and therefore to be avoided.
Refinery throughput	This figure is not regarding capacities, but the real amount of crude material (oil, natural gas) fed into the refining unit.
Proved reserves[3]	Estimated quantity of crude oil, natural gas and liquefied gas products that can be commercially extracted from already known reservoirs with a high degree of certainty (over 90%) and under the prevailing economic and operating conditions.
RRP	Rotterdam-Rijn Pijpleiding Maatschappij. The shareholding companies are: Shell Petroleum N.V. 40%, Ruhr Oel GmbH 20%, BP Mineralöl GmbH, 20% Shell Deutschland Oil GmbH 10%, Texaco Nederland B.V. 10%. The rout goes from Pernis near Rotterdam to the German boarder.
SPSE	(Société du Pipeline Sud-Européen) Crude oil pipeline from Fos sur Mer to Karlsruhe, supplies interior France refineries, Switzerland and Germany. At present the shareholders are: Total 27.84 % ExxonMobil 22.00 %, Société de Participations dans l'Industrie et le Transport du Pétrole(Held by BP, BASF and Shell) 15.40 %, BP 12,10%, Shell 10.32% and ConocoPhillips 2%.
TAL	Transalpine Pipeline starting from Trieste, Italy crossing the Alps, supplying Austria and by parts of Germany and the Czech Republic. The operator is a joint venture of oil companies owning shares as follows. OMV 25%, SHELL 24%, ExxonMobil 16%, RuhrOel 11%, ENI 10%, BP 9%, ConocoPhillips 3%, Total 2%
	National Oil Industry Associations:
FVMI	Austrian Petroleum Industry Association
MWV	German Petroleum Industry Association

[3] From MOL's „Annual Report 2007" p. 218, Glossary

Unione Petro-lifera	Italian Petroleum Industry Association
Sappo	Slovakian Petroleum Industry Association
Cappo	Czech Petroleum Industry Association
MAS	Hungarian Petroleum Industry Association

3.2. An introduction into refining[4]

In the course of this work, “refining” will be among the most commonly used terms. Hence I would like to introduce the reader to some technical issues in the refining industry in order for the process of refining to become understandable and to give meaning to bare terms.

Crude oil is the raw material for a large variety of products: motor fuels, lubricants, cosmetics, plastics and cleaning agents. Each of these consumer goods contains at least a fraction of crude oil or its distillates. It follows a brief insight into the technical issues associated with refining and the choice of location of a refining site.

When contemplating the best location for a refinery, there are two immediate choices available. A refinery can be planned where oil deposits have been found or be placed in proximity to the centres of consumption – industrial and densely populated areas. Building refineries next to deposits is not sensible in Europe given that the majority of crude oil has to be imported. Refineries next to large oil harbours can be considered as being the “raw material oriented” European version of premises close to the sources of supply. Building refineries at locations where they can be most efficiently supplied with crude oil does not necessary imply that all of its produce is locally in demand. Small volumes that may be complex to handle (e.g. bitumen that has to be continuously heated) have to be transported to the customers. On the other hand, densely populated regions may not necessarily be located on the sea: consider the region Vienna-Bratislava, or the Ruhrgebiet in Germany.

Refineries that meet local demand have to be connected to a crude oil pipeline in order to achieve economically viable utilization rates. The produce of the different products has to be shipped with various different means of transport over small distances to the customers, whereas supplies of feedstock can be bundled using tankers or pipelines. Over time, a trend towards “consumer-oriented” choice of locations has been observed, however both types can still be found: Italy’s refining hot spots are in the north of Italy, where most industry is located (consumer-oriented) and in Sicily, where huge capacity levels were created to exploit the favourable position in the Mediterranean Sea where many shipping routes intersect.

The most important transformation in the industry has been the change in demand. Demand has shifted from heavy sulphuric products towards lighter products: demand for diesel soared throughout Europe, but there has also been a rise in demand for chemical feedstock. This shift in demand requires refinery operations to be revised and investment in conversion capacity. Conversion plants enable the conversion of

[4] MWV, “Mineralöl und Raffinerien”, Hamburg, 2003

heavy sulphuric residues into lighter, less sulphuric products and thereby increase the recovery of diesel fuel, for instance.

The design of a refinery has certain characteristics. A large compound is necessary, and a direct connection to railroads and/or waterways is favourable. In addition to the processing plants, facilities for power generation, storage deposits, laboratories and control centres are needed. Although automation of technical processes prevails, around 500 people are employed to operate a medium-sized refinery, working in shifts. For efficiency reasons, a refinery has to be in permanent operation throughout the year, with shutdowns for service and modification works. The capacity of a refinery derives from the first step in crude oil processing – the capacity for atmospheric distillation; effective throughput rarely comes up to the so-called nameplate capacity, the theoretically feasible throughput.

There are many different grades of crude oil. Some are light and of low viscosity like the Libyan Zueitina which are suited to be turned into fuels and especially middle distillates (diesel, kerosene). Others come up with high viscosity and sulphur content and are more appropriate for the production of heavy fuel oil, bitumen, displaying lower recovery rates for middle distillates (only 26% compared to 39% recovery from the aforementioned grade). Three different kinds of activity can be distinguished in the refining process:

- Separation
- Conversion
- Post-treatment

Separation

The first step in processing is the separation of the crude oil from the salt water it contains upon arrival, as a result of it being stored in the natural deposits and being transported in tankers. The different components are separated by distillation – the crude oil gets heated and products with different boiling points get separated.

Fractionation is done at temperatures between 350 and 370°C at atmospheric pressure in Fractionating columns. Vaporised properties and are separately condensed. The lightest products (gases like methane or butane and naphtha) condense at the top of the contactor, whereas in the middle of the tower the so-called “middle distillates” are obtained. Middle distillates are the main components of diesel, light fuel oil or kerosene.

Residues of atmospheric distillation are the feedstock for vacuum distillation, the output of which can be blended with middle distillates or are the base material for conversion plants.

Conversion

The molecular structure of distillates gets changed during conversion: Larger molecules are cracked into smaller ones so that products with lower densities are obtained. “Cracking” can be considered as a collective term for the different techniques and procedures available.

By altering the temperature, the way in which each distillate is used from combined production can be changed – 3-5% of middle distillates can, for instance, be blended with petrol. However these variations are subject to narrowly set constraints due to certain quality requirements. Moreover, while different grades of crude oil can be used, lighter oils are more expensive and may not always be available. As a consequence different methods have been developed to crack longer molecular chains into shorter ones, thus converting heavy components of crude into lighter ones.

Thermal cracking

Residue from atmospheric distillation is overheated under pressure. Molecular bonds are broken when temperatures range between 360°C and 500°C.

Visbreaking is the “mild” option in which lower temperatures are used and the residue from vacuum distillation can be employed. “Visbreaking” is about lowering the viscosity of oil.

Catalytic cracking

Catalytic cracking results in a higher yield as compared to thermal cracking. This means a higher proportion of residue is converted. Aluminium silicate is used as the catalyser.

Hydrocracking

Hydrocracking is the most technically elegant and flexible method, though it requires large investment and it is the most expensive technique. It can be described as catalytic cracking in the presence of hydrogen: the cracked molecules are enriched with hydrogen under high pressure. This method necessitates huge amounts of hydrogen and most refineries applying it produce hydrogen on site.

Coking

Residue from vacuum distillation and thermal cracking can be fractioned once more. Gases, petrol, middle distillates and petroleum coke can be obtained.

Post-treatment

This term covers the removal of unwanted ingredients, referring to de-sulphurization in particular. This step in production is crucial to attach the desired characteristics to the products and to meet quality and environmental regulations. De-sulphurization is performed in a so-called hydrofiner. In a hydrofining unit, products undergo de-

sulphurization with hydrogen. By using the Claus-unit afterwards, elementary sulphur can be obtained. The process of hydrofining not only lowers the sulphur content of the product, but the flammability of the products is also improved.

Catalytic reforming improves the knock resistance of petrol that would be too low even after blending with other components. The fuel grade can be enhanced and the required octane number of 95 can be achieved.

Post-treatment of distillates also includes blending – petrol for instance consists of up to 12 components that have to be blended in a way which is even dependent on the season of the year.

There are a multitude of different procedures to fully exhaust the potential of crude oil and for further raising the yield of light products. However, I would like to conclude the technical explanations because this introduction is only intended to give the reader a sense of what refining, the term that is so often used in this work, is all about.

Science will certainly provide innovations to improve efficiency with regard to yield and energy consumption. Providing a refinery with power, chemical feedstock and water requires great efforts and increasing yield, energy efficiency and flexibility is therefore of utmost concern. The above section reveals several implications for the industry. At first constraints on the choice of location of a refinery arise: it has to be located on the shore or in proximity to a crude oil pipeline with sufficient vacant capacity to ensure supply with feedstock. Most refineries come up to a capacity of at least 50 000 bbl/d (~ 2.5 m tons per year), but even the six fold is common. This indicates that substantial economies of scale can be achieved.

A company operating in a country located on the sea may have comparative advantages over a firm operating in a landlocked country. As suitable compounds for a refining located on the sea or a pipeline are limited choice of location is a potential barrier to entry into the industry. This can likewise be applied to the complex technology necessary for some conversion processes. If they can not be bought on the market, considerable expenses for research and development would incur for any entrant.

4. Definition of the markets

According to Motta (2007), there are different approaches to examining the market power of firms: The modern way, using econometric techniques to answer the question of the profitability of raising prices and a more traditional approach. The latter is applied when an econometric model is not feasible and tries to assess markets that the firms operate in, defining the "relevant markets".

> *"This requires defining the relevant market", that is the set of products and geographical areas to which the products of the merging firms belong."*[5]

The relevant market should be a set of products that resemble each other and mutually exercise competitive constraints; as a result of which it should cover products that are substitutable so the stimulus for the seller to raise prices can be limited.

4.1.1. The SSNIP Test

The SSNIP (Small but Significant Non-transitory Increase in Prices) test guides the analysis towards the relevant product and geographic market. The SSNIP or "hypothetical monopolist" test allows both: The definition of the relevant market in terms of which products should be covered by analysis as well as the definition of the relevant geographical market.

To implement the SSNIP Test, I will apply Motta's approach to a greater or lesser extent and try to conclude with reasonable market definitions and knowing which markets to focus on – my intention was to focus on the refining market and investigate the markets for transport and bunkering of crude and processed oil. The SSNIP Test poses the question whether a hypothetical monopolist would find it profitable to raise the price above the current level permanently by 5-10%, a percentage rate used by the European Commission.

If the answer is yes, a rise in price would be profitable. This means that the relevant products are not subject to competitive constraints from other products, there are no adequate products substitutable enough and the market is found. The products, for instance refined oil products, do constitute a separate market and the test is finalized.

If the hypothetical monopolist does not find it profitable to raise prices, demand shifts to other goods which are more or less substitutable. This implies that other goods pose a competitive constraint on sellers' products. The definition of the relevant product market should be broadened and the test repeated. The question if a permanent rise in price by 5-10% above the current level would be profitable is asked again. If the price increase is profitable, the relevant market will be found. If the an-

[5] Motta (2007), p. 101

swer is negative more products that pose a potential competitive constraint have to be included and the test has to be rerun until a separate market is found.

4.1.2. Definition of product markets

Looking at demand and supply substitutability, things get somewhat clearer. Demand substitutability shows the reaction of consumers facing higher prices and switching to other products or sources of supply. For buyers of refined products that are usually traded in bulk loads, this entails buying e.g. motor fuels from another producer or getting involved in refining.

Supply substitutability describes the circumstances under which a producer has the knowledge and equipment to switch production in a short period of time. The competitive constraint does not result from the shift in demand to other suitable products but from attracting producers of other goods to enter the market.

As refined products are standardized, a producer of “other goods” would simply be the operator of a refinery in a neighbouring area. If a seller of oil products raises prices, operators of adjacent oil refining sites would enlarge their operating area and supply the region where prices have been raised – provided that spare capacity exists and transport costs are competitive. As such, operating areas may overlap though it is not evident because prices are not raised above the competitive level. Refineries that operate parallel in separate areas can therefore pose a competitive constraint on each other.

In reality, buyers of refinery outputs can only switch to another supplier of the same standardized product as switching to e.g. pure biogenetic fuels is not feasible at short notice. Even if switching the product would be feasible, the retailer could not sell it due to technical restrictions (car engines that would have to be modified or heating systems that need a certain fuel). Fossil fuels can not be completely replaced from one day to the next.

However, entry should not incur considerable sunk costs; switching production must be easy, rapid and feasible. Entry barriers have to be manageable. Newcomers in the European refining sector would have to invest vast amounts of capital into constructing an oil refinery. Moreover, in landlocked areas, supply with crude oil has to be ensured by a network of oil pipelines in order to achieve sensible capacity utilization and exhaust economies of scale. Entry would also cause notable sunk costs, as it would require large investments into very specific equipment (distilleries, oil pipelines) that can neither be used for other provisions nor be resold.

The most practicable alternative may be the entry of a firm that is already engaged in refining and has spare capacity in transport, storing and processing, helping to keep investment to a minimum. Furthermore, a takeover of existing oil refining premises

would be an option as construction of new refineries in Europe is subject to many obstacles. Pressure groups, environmental regulation and emission control exacerbate such undertakings.

With regard to the transport of oil and its follow-up products, results are a bit different: Transport can be carried out by pipeline, by oil vessel or in tank wagons by rail or tanker lorry. Each kind of transport is substitutable with the other, though sometimes subject to certain restrictions: The cargo of a tanker can be shipped by trucks provided that they are available in large numbers but transport on the road is the most expensive and dangerous alternative.

Switching from trucks to transport by rail is easier. Rail networks are quite dense in Europe and a complete freight train with tank wagons has a lot of capacity. Existing pipeline networks are not available anywhere. They require a lot of capital and are mainly used to supply inland refineries – so they can not even be used for transport to the consumers or petrol stations.

A paper by the German association of petroleum industry[6] provides the following account shown in TABLE 1 and TABLE 2.

Substitutability of / **by**	Crude oil vessel	Pipeline	Barge	Railway: Tank wagons	Tank truck
Crude oil vessel	⊘	+	+	⊘	⊘
Pipeline	+	⊘	+++	+++	++
Barge	+	++	⊘	+++	++
By rail: whole train	⊘	++	+	⊘	++
By rail: single wagons	⊘	+	+	⊘	+++
Tank truck	⊘	+	+	++	⊘
	+ possible under certain circumstances ++ basically possible +++ possible and common practice ⊘ not feasible				

TABLE 1: SUBSTITUTABILITY OF MEANS OF TRANSPORT

[6] MWV “Mineralöl-Logistik” (1999)

Criterion / Mode of Transport	Crude oil vessel	Pipeline	Inland navigation vessel	Railway: Tank wagons whole train	Railway: Single tank wagons	Tank truck
Transport bulk loads	1	1	2	3	5	6
Network infra-structure	5	6	5	3	2	1
Flexibility: relations/amounts	3/2	6/4	5/3	4/2	3/2	1/2
Quickness	4	3-4	4	2	3	2
Reliability/Safety	3	1	3-4	2	2	3-4
Economic efficiency	1	1	2	2	4	5
	1=Most suitable 6=Inapplicable					

TABLE 2: ABILITY OF TRANSPORTING BULK LOADS

TABLE 1 and TABLE 2 show that different means of transport are only substitutable to a certain extent – but substituting any kind of transport of oil or its follow-up products would imply that these goods must be obtained from a crude oil refinery next door or doing oil refining on one's own behalf.

However producing close to a refinery is not possible everywhere for obvious reasons and refining oil on one's own may be difficult due to a lack of knowledge and technology – or at least inefficient – as the refining business is subject to considerable economies of scale (lower production costs at a larger number of units produced due to the degression of fixed costs.) and scope. Economies of scope occur when profitability can be raised by producing a larger range of products, e.g. to produce petrol and diesel, fuel oil and selling the distillation grain as bitumen for the production of asphalt.

It is difficult for new firms to enter into the oil transporting business, with the possible exception of tank trucks. This business is in particular subject to extensive safety regulation by each country of operation and the United Nations.

With regard to storing: The demand for storage facilities is neither totally substitutable for products nor crude oil as both are transported in very large amounts and cannot be consumed or processed all at once. Supply substitution may be somewhat conceivable than when it comes to transport or refining – at least entry is more likely in

this market. In any case, substantial sunk costs are unavoidable as big investment in special equipment is necessary.

There are some instruments facilitating the definition of markets:

Own price elasticity, defined as “the percentage change in the quantity demanded that follows a one-percent increase in the price of a product.”[7]

A low elasticity can be regarded as an indication of a rather inelastic demand and a rise in price is possibly profitable. PVM Oil Associates records elasticities of demand of -0.26 for diesel and -0.31 for petrol. These are figures for the short run (< 1 year), in the medium or long run demand might be a little less inelastic. Society is fairly dependent on petrol. Envisage a family living on the countryside: Waiving the car is not an option when there is no adequate public transport system available.

The elasticities above indicate that it may be profitable for a hypothetical monopolist to raise prices of refined oil. Demand elasticity for storing and transporting oil and secondary products is therefore not supposed to be appreciably higher as the products that are bought regardless must be transported and stored. However substitution plays a major role in transporting: Higher freight rates for tank containers or tank wagons may lead to a higher demand for transport on the road, though switching means of transport depends on spare capacity.

Examining cross-price elasticities between petrol and its closest substitutes might be an option. However one has to face the question of what the closest substitutes for petrol are when it is used for transportation or industrial consumption. Electricity and natural gas are the most obvious alternatives, but subject to technological constraints. Modifying the engines of millions of cars and buses would be necessary, disregarding the fact that fully electric cars do not match petrol-driven ones in terms of range and velocity.

Price correlation tests follow an appealing idea: If products belong to the same markets, their prices will tend to move in the same way over time. Problems arise if products share a common input. This is exactly the case– the common input is mineral oil. Oil and natural gas prices are closely linked and both are commonly used in power generation. Considerable spurious correlation would be the outcome; applied econometric methods would conclude with contexts that do not exist.

The last point would be thinking about the characteristics of mineral oil as a primary resource and the wide range of follow-up products. However, allowing crude oil and its derivatives to be used in the same market is not a plausible approach. It can be assumed that they constitute separate markets. My intention to investigate the mar-

[7] Motta (2007), p. 105

kets for refining oil, transporting and storing it and its secondary products seems to go along with theory. What remains is the proper definition of the geographic areas I shall focus on.

4.1.3. Geographic market definition

Once again, the SSNIP Test poses the question if the hypothetical monopolist of any region would find it profitable to increase prices by 5-10%. If the answer is yes, the correct geographic market has been found. The task will be finding out if the relevant areas coincide with national states or if there are international markets.

Motta stresses the role of imports or, more generally speaking, the intensity of foreign trade in the product in question. Put simply, imports into a country diminish the hypothetical monopolist's chances of raising prices profitably.

Since the SSNIP test is not feasible for the above-defined relevant product markets, information has to be collected on which areas actually represent a common market. Shipment tests can be of valuable assistance.

Elzinga and Hogarty (1973) suggest analysing data on foreign trade to identify the relevant geographic markets.

> *"The test has two components, the first to establish whether there is "little in from outside" (that is, imports account for a small part of local consumption) and the second that there is "little out from inside" (exports account for a small part of local production."*[8]

If imports have a considerable share of consumption in a certain region, it follows that this region is subject to competitive constraints. The defined geographic area should be enlarged.

Another question is if exports from the area that has been defined as being the relevant geographic market represent a considerable share of production of the product. If the answer is yes, exports would be profitable and the producer could compete with a company in a market where he is not yet producing. Transport costs and trade barriers do not prevent the manufacturer from enlarging his operation area.

LIFO and LOFI values are calculated as follows:

$$LIFO = \frac{(\mathrm{Pr}\,oduction - Exports)}{Consumption}$$

[8] Motta (2007), p. 114

Consumption results from production minus exports plus imports minus changes in stock. Assuming stock being constant, LIFO can also be calculated this way

$$LIFO = 1 - \frac{\text{Imports}}{Consumption}$$

A LIFO value close to one may indicate that the given region is supplied by domestic producers to a large extent. The area under review can then be assumed to constitute an independent market.

The calculation of LOFI values is done analogously

$$LOFI = \frac{(\text{Pr}\,oduction - Exports)}{\text{Pr}\,oduction}$$

and respectively

$$LOFI = 1 - \frac{Exports}{\text{Pr}\,oduction}$$

A LOFI value close to one indicates that the domestic production is bound for the local market and the area can be considered being a self-contained market.

If LIFO and LOFI values do not reach a certain value, the area the test has been carried out for does not constitute the relevant geographic market. In practise, the area under review is widened and neighbouring regions are included. The test is repeated, asking if the area in question is subject to competitive constraints originating from other regions until both measures get close to one.

The test is frequently used in analysis because data is easily available and the test comes up with good explanatory power. The European Commission takes values of 0.8 - 0.9[9] to define the area in question to be the relevant market. These thresholds however are somewhat arbitrary as the EC even finds separate markets if the Elzinga-Hogarty test fails completely or the LIFO test is passed whereas the LOFI test fails[10].

Drawing conclusions from results of the test, there are though some restrictions that have to be made. Low levels of foreign trade in a product may be the result of regions lacking suitable transport systems connecting each to other areas or prices being equal and transportation costs high. If the rise in price is high enough, shipping

[9] In (Saint-Gobain/Wacker-Chemie/NOM), Case IV/M774 [1997] O.J. L247/1
[10] Mannesmann/Vallourec/Ilva, Case IV/M315 [1994] O.J. L102/15

goods over large distance may become profitable. Furthermore, tariffs or non-tariff barriers in trade can be rationales for only a few shipments to occur. In the case of refined products, the absence of product pipeline networks, waterways or railroads can explain low trade activity.

Fuels are standardised products; consumers usually do not have a preference for "homemade petrol" so if imports are profitable they will be transacted. Substantial elasticity of imports is crucial, because imports do not only have to be feasible; the quantity imported must also be increased in cases of a price rise to occur in the domestic market. Import elasticity gives the proportional increase in imports if the price changes on the domestic market.

Transportation costs can also point out what limits the proper geographic market could have. The ratio of transportation costs and the value of the goods transported should be examined. As far as good "refined petrol" is concerned, this is questionable if transportation costs really loom large. Most of the crude oil processed in Europe has already come a long way: crude oil coming from outside of Europe is shipped to Europe exclusively with tankers and is until then more or less exclusively forwarded by pipeline to the oil refining units. Consequently, shipping the oil a bit further does not really seem to matter. However it is clear that there is little difference in commodity prices (the prices for crude oil) paid on international commodity exchange markets. Minimizing transportation costs gives, as always, a competitive edge over another company and thus remains a key principle.

The costs of the eligible means of transport will be a central point in answering this question. The EC has declared some markets as being global in cases where transportation costs did not play a major role, e.g. in the aircraft industry case Aérospatiale-Alenia/de Haviland or the Boeing/McDonnell Douglas case.

With this theoretical background, it will be feasible to determine the relevant geographic markets to be analyzed in detail. The market for transportation of neither crude oil nor its follow-up products is not to be limited by national borders. The market for storing crude and refined oil is again dependent mainly on means of transport required for bulky loads. The market for storage of crude and oil products can be considered to be nationwide, as each state has its own provisions for holding emergency reserves that definitely have to be stored within national borders. Each refinery or tank farm is able to supply a certain area around; the radius clearly depends on transportation costs. PVM Oil Associates figures average weighted costs of 15-25€ per ton for 2003. PVM Associates distinguish between primary costs and secondary transportation costs: Primary costs are defined as the costs that occur externally before the crude oil reaches the tank/the refinery (transit costs for pipelines, freight

rates for tankers). Secondary costs are the ones that arise for storage or supply in-house. For 2004 PVM puts them at 6-10€ per ton, excluding overall costs.

Estimating cost-price proportions could provide further evidence of the shape of relevant geographic markets. I assume that the maximum of both, primary and secondary costs, get realized. I add 5€ to the amount of €35 in order to account for some inflation, totalling €40.

The ratio will be calculated for the entity of a metric ton. Clearly the proportion depends on the price of a ton of crude oil and the EUR/USD exchange rate. A metric ton corresponds to 1,165.34 litres and 7.3298 bbl respectively

June 2008, USD/bbl 132.32, USD 1.5562 had to be paid for € 1

$$85.08 \times 7.3298 = 623.62\ €/ton \qquad \frac{40}{623.62} = 6.4\%$$

May 2009, USD/bbl 54.31, EUR/USD exchange rate: 1.3422

$$40.46 \times 7.3298 = 296.56\ €/ton \qquad \frac{40}{296.56} = 13.49\%$$

Both examples show, even in a situation where the price for crude oil is low, the proportion of transport costs does not exceed the 10% mark by far. A 10% share of transportation costs to the value of the good is considered as being “high transportation costs” by the EC.[11]

In order to demarcate a manageable geographic area, the costs of transport from the oil refineries to the tank farms and thence to the costumers are of importance. Transport by train can be maintained on a profitable basis for a distance of 1500 km[12] according to the PVM-study. Taking Vienna as a hub, this would justify considering imports from the west coast of France to Moscow in the east. This definition seems to be a little too broad. Besides, transporting oil or fuels by tank wagon is the second most expensive means of transport. Reviewing EC decisions on merger issues in the refining industry could bring further insight.

BP/Amoco

The BP/Amoco case is more or less about petrochemicals. The EC did not consider the relevant geographic market to be larger than the European Economic Area, though the parties claimed it was worldwide. The arguments were based on a lack of

[11] Case No COMP/M.4173 - NIPPON SHEET GLAS /PILKINGTON and Case IV/M358 [1994] O.J. L158/24 accordingly

[12] PVM Oil Ässociates „Der Österreichische Kraftstoffmarkt 2004“ p.136

considerable import volumes to the UK with these being done by one of the merging parties, AMOCO. Moreover, the EC saw a concentration of essential facilities in the hands of one of the two.

TOTALFina/ELF Aquitaine

Because of high freight rates for tankers, the majority of refined products sold in France come from French oil refineries. Infrastructural provisions determine the definition of markets. Products that have been sold are shipped from refineries or tank farms to the respective surrounding area, sold at 25% on a local and 75% on a regional basis. The market areas are defined by radii around refineries, tank farms and pipelines supplying them. The firms regarded the market to be a national one, pointing out the inter-regional commodity flows. However the EC rejected this. Spatial markets may contain a plurality of overlapping areas but trading areas of tank farms in France do not overlap.

Shell/EON

The German Bundeskartellamt did not consider it necessary to rebuff the proposal of the firms to regard the market for bitumen as being a national one. The firms brought the arguments that overlapping markets and therefore a chain of substitution effects exist. An increase in price would cause waves of price adjustments, starting from the place the price was raised initially. Regional price differences would therefore persist only for short time.

STATOILHYDRO/ConocoPhillips Scandinavia

The market for retail sales was considered a national one (Denmark, Norway and Sweden). Owners of gasoline-driven cars tend to use service stations in the vicinity of their home or place of work. Overlapping catching areas of service stations create knock-on pricing effects and local prices depend on recommended national prices set by each company. Finally, most service stations are constrained by a chain of-substitution effect.

BP/Mobil

The EC regarded the market for ex-refinery sales as being constituted by the 1996 borders of the European Union or including at least the countries concerned by the merger. The EC found the following evidence: There has been significant cross-border trade, price differences were relatively small and mainly due to shipping costs. Further pricing policies were decided on a national level and in this instance regional /national market shares resembled each other. The non-retail market for refined products is supposed to be national: price transparency prevailed and overlapping supply boundaries were the case. Exchange and supply agreements between suppliers and buyers that purchase on a national basis were observed. Moreover, the EC regards the market for bitumen as national and the one for lubricants as national.

Conoco/Phillips Petroleum

Retail sales of motor fuels were regarded as national markets whereas fuel-refining activities and ex-refinery sales represent EU-wide markets.

PKN / MAZEIKIU

The core markets of the companies are Poland and Lithuania. Ex-refinery, cargo sales were supposed to be confined to EU borders or by the CEE[13] countries and often Austria and Germany. That was based on the assumption that relatively low transportation costs would only have a marginal impact on product prices. In contrast: Non-retail sales are regarded as taking place on national markets, retail sales have been seen as being the farthest national in scope. In the PKN-Orlen/Unipetrol (CZ republic) case, non-retail sales were restricted to a 100-150km radius from each point of supply.

Preem /Skandinaviska Raffinaderi

The market for crude oil refining was considered being as at least north-west European or Scandinavian, the market for non-retail sales constituted by Scandinavia, retail sales as being national markets because of taxation, overlapping catchment areas and nationally organised sales.

To sum up, it can be said that markets for oil products have to be designed along the infrastructure that can be found. The market for refining may exceed national borders and include the countries surrounding the “core country” of investigation, due to relatively low costs of transportation and (of course depending on the countries involved) substantial imports and exports in a competitive environment.

Non-retail sales are supposed to be national markets because of overlapping markets and chain-of substitution effects that lead to adaptation of prices. Retail sales are considered as being national in scope or even narrower, because end consumers of motor fuels frequent service stations in the vicinity of their place of work or residence. These will be the definitions for the relevant geographical markets, which will be confronted with reality when the countries in question are under review.

[13] Central and Eastern European countries:, including: Poland, Czech Republic, Slovakia, Hungary and Baltic States: Lithuania, Latvia, Estonia

5. The countries at a glance

5.1. Austria

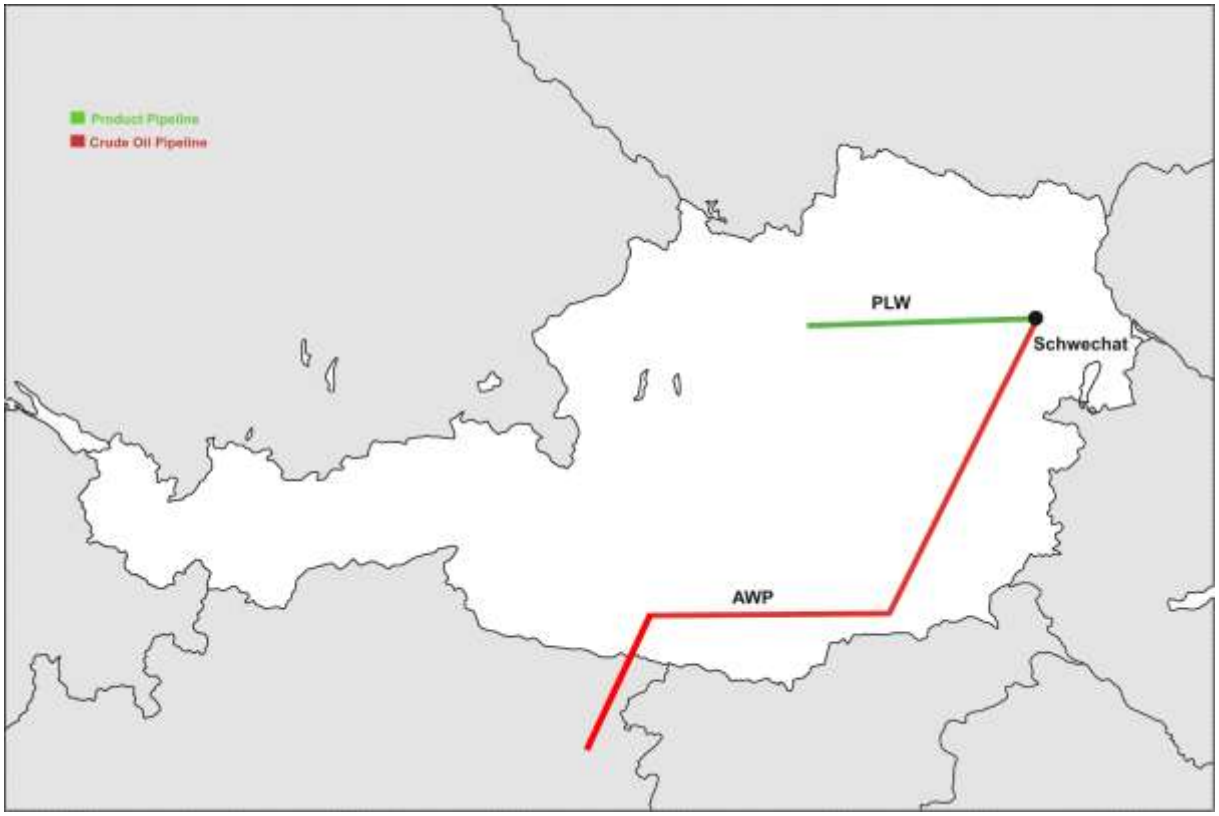


FIGURE 1: AUSTRIA

Figure 1 provides a general idea of the Austrian oil industry's infrastructure. Crude oil pipelines are plotted in red, product pipelines in green; the black dot marks the location of a refinery. According to the BP Statistical Review 2008, 13.5 m t crude oil were consumed in Austria in 2007. 7.642 m tons crude oil were imported. Oil–refining activities including semi-finished products add up to 9.09 m tons per year. Total capacity runs up to 9.6 m tons per year.

Figure 2 below reveals that Austria's annual consumption of oil products cannot be covered by its capacity. The shortfall has to be imported from abroad as oil products.

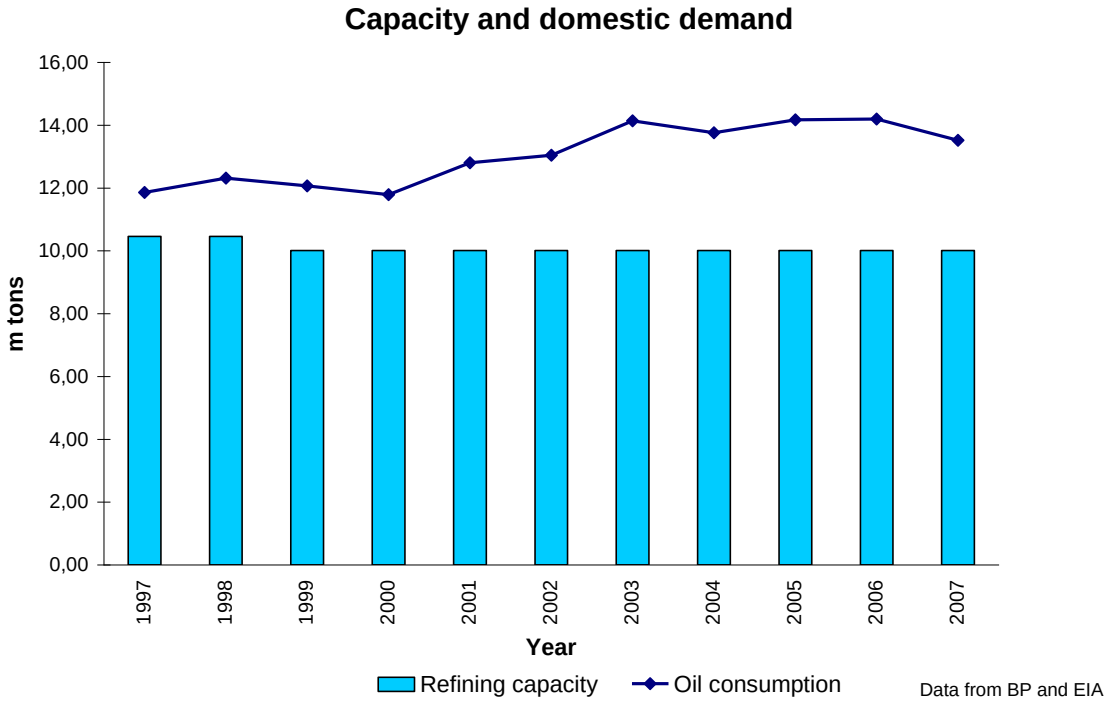


FIGURE 2: AUSTRIA, REFINING CAPACITY VS. DEMAND

Company	Refining sites	Nameplate capacity in m tons	Share in equity	Location	Distillation Capacity in m tons	Total	Market share in %
OMV	Schwechat Refinery	10.00	100.00%	Schwechat	10.00	10.00	100.00%
TOTAL						10.00	100.00%

Source: IEA[14]

TABLE 3: AUSTRIAN REFINERIES

In TABLE 3 above, it can be seen that all refining in Austria is done at the sole Austrian oil refinery in Schwechat, run and owned by OMV.

As a landlocked country, it is somehow remarkable that the country runs a refining site which is also held to be the largest of its kind in a landlocked country. OMV is able to do so thanks to the continuous supply of oil from the AWP (Adria-Wien Pipeline).

Crude oil bound for Austria originates from Kazakhstan (~25%), Libya (23%), Iraq, Syria and Saudi Arabia – Austrian crude oil supply can therefore considered as being very diverse. Imports from the politically unstable and by extension unreliable Russia decreased by 80% compared to 2006. It now accounts for no more than 3.2% of Austrian oil imports. There have been plans to connect the Schwechat refinery to the Druzhba pipeline that transports oil from Russia through the Bratislava-Wien-Pipeline

[14] IEA Energy Policies of IEA Countries “Austria 2007 Review"

(BSP) but these have been postponed following Slovakian objections concerning the route of the pipeline. OMV hopes the decision is to be made in 2009.

Agip Austria (4%), BP Austria (20%) and OMV (76%) are holding interest in AWP. The TAL (Trans Alpine Pipeline) is a joint venture of OMV (25%), Shell (24%), ExxonMobil (16%) and other major oil companies.

Calculating LIFO and LOFI in TABLE 4, values of 0.47 and 0.73 respectively are an indication that the market for refining products might be larger than Austria.

LIFO		
	2007	**2006**
	0.47	0.49
LOFI		
	2007	**2006**
	0.73	0.79

TABLE 4: AUSTRIA, LIFO & LOFI VALUES

In TABLE 5, domestic production is plotted against the imports of various refined products. Imports play a big role in Austrian fuel supplies. Further analysis will show the direction of trade flows. The LOFI values suggest that Austrian refining capacity is bound for providing the domestic market and exports might concern excess production of certain produces.

The supply of oil products for Austria is sketched as follows[15]; please note that it is not congruent with Austrian demand – due to re-exports and stock movements.

[15] Figures from FVMI "Jahresbericht 2007", there are some variations compared to figures in BP's "BP Statistical Review of World Energy June 2008", but they are small in magnitude.

Domestic production vs. Imports 2007					
	Domestic production		Imports		Total
	in t	in %	in t	in %	in t
Liquefied Petrol Gas	70,048	35.3%	128,565	64.7%	198,613
Gasoline					
Super Plus - bio	80,952	65.6%	42,506	34.4%	123,458
Super Plus + bio	46,477	98.9%	534	1.1%	47,011
Eurosuper - bio	895,594	60.4%	587,468	39.6%	1,483,062
Eurosuper + bio	401,561	79.4%	104,444	20.6%	506,005
Regular gasoline - bio	225,610	62.8%	133,440	37.2%	359,050
Regular gasoline + bio	87,941	79.4%	22,808	20.6%	110,749
100% Biogenetic fuel additive	-	0.0%	28,990	100.0%	28,990
Special gasoline	1	0.0%	6,510	100.0%	6,511
White Spirit	-	0.0%	5,666	100.0%	5,666
Middle distillates					
Kerosene	1,020	93.3%	73	6.7%	1,093
Turbine fuel	603,800	79.1%	159,203	20.9%	763,003
Diesel - bio	455,570	49.7%	460,586	50.3%	916,156
Diesel + bio	2.520,890	39.8%	3,812,172	60.2%	6,333,062
100% Bio diesel additive	49,150	44.5%	61,292	55.5%	110,442
Fuel oil extra light	608,337	45.8%	720,310	54.2%	1,328,647
Fuel oil light	344,619	100.0%	-	0.0%	344,619
Fuel oil heavy	426,895	70.1%	182,506	29.9%	609,401
Other					
Lubricants	122,139	70.0%	52,263	30.0%	174,402
Bitumen	410,873	60.5%	267,873	39.5%	678,746
Other	452,336	93.5%	31,274	6.5%	483,610
TOTAL 2007	**7,803,813**	**53.4%**	**6,808,483**	**46.6%**	**14,612,296**
2006	*7,870,730*	*52.4%*	*7,141,616*	*47.6%*	*15,012,346*
+ bio refers to motor fuels with biogenetic additives and vice versa					

TABLE 5: AUSTRIA, DOMESTIC PRODUCTION AND IMPORTS

Looking at TABLE 5 above, a general decrease in demand can be noticed. What is striking is the considerable dependency on imports of middle distillates. Almost half of the demand for diesel has to be covered by shipments from abroad.

The shaded areas show significant import shares, omitting LPG (Liquefied Petrol Gas). There is a need for substantial amounts of Eurosuper, particularly for distillates, for diesel and extra light fuel oil. Biogenetic fuel additives also have to be imported to a large extent but as it does not concern refining, this is not relevant for this investigation.

Besides, a part of the demand in bitumen has to be covered from abroad; this may be due to the fact that, for the production of bitumen, a heavier, more sulphuric crude oil has to be processed. In Schwechat the largest part of crude oil refined belongs to the group of “sweeter oils”, which are lighter and less sulphuric.

Data from the Federal Ministry of Economy for 2007[16] show the main origins of Austrian oil products imports: 56% of all imports of products originated from Germany, 12% from the Slovak Republic, 10% from Hungary and 7% from Italy. 2% of imports came from Belgium that can be taken as an indicator for the transit distances accepted. Most of the imports have been transported by rail. The most important refineries for the supply of Austria listed by PVM Oil Associates GmbH clearly include refineries in the above-mentioned countries.

PVM cites the refineries in Burghausen (OMV), Ingolstadt (OMV (45%), BP, Agip, and PDVSA[17]), Bayernoil and Karlsruhe, together with Italy's refineries in Porto Marghera and Sannazzaro (Agip), MOL's refineries in Bratislava and Százhalombatta and the Kralupy refinery in the Czech Republic. Additionally I would list the IES Mantova refinery in Italy that MOL has acquired.

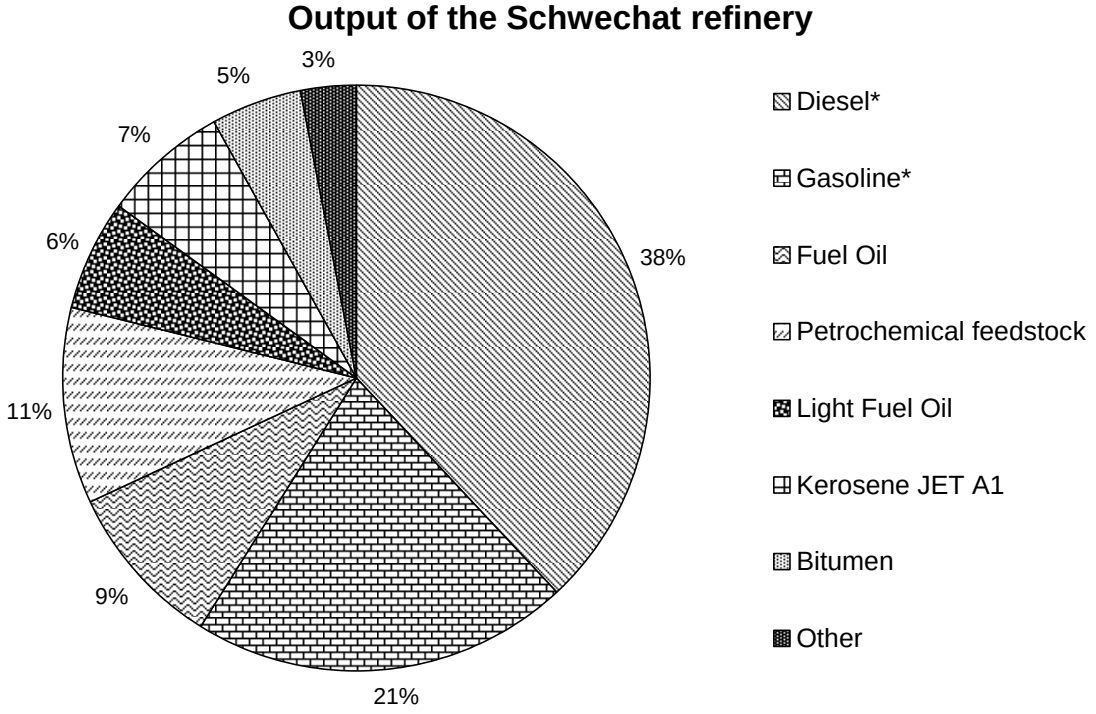
In 2007, Austrian exports had the following destinations: 29% Czech Republic, 23% Hungary, 14% Slovakia and Romania, Bulgaria and France with around 5%. All this information about Austrian imports and exports helps in two ways: It acknowledges somehow the geographic market definition determined above – the market for refining is to be a regional one, with national borders not really playing a role, at least within the EU.

When it comes to Austria, its market can not be considered as being separate from the markets in Italy and Germany, Slovakia, Hungary and the Czech Republic, since imports cover more or less half of Austria's demand and these countries are the most important exporters of oil products to Austria. Secondly the findings raise the question of OMV's market position in Austria, in some of its eastern neighbouring countries and in southern Germany.

5.1.1. Refining

According to the FVMI (Fachverband der Mineralölindustrie), OMV's Schwechat refinery had a throughput of 8.57 m tons of crude oil (8.49 m t in 2006) and 0.52 m tons of semi-finished products, achieving a plant utilization ratio of 91%. The output structure is sketched in FIGURE 3 below. This single refining site covered about 65% of Austrian demand for oil products (2006) according to the Austrian Department of Trade and Industry.

[16] Federal Ministry for Economics 2008
17 Petróleos de Venezuela S.A., remark



*Diesel and gasoline were blended with bio fuel components.

FIGURE 3: AUSTRIA, OUTPUT OF THE SCHWECHAT REFINERY

According to the consumption statistics of the Austrian Department of Trade and Industry, demand for 2007 amounted to 12.01 m tons (2006: 12.79 m tons). There is a decrease in demand for gasoline and a rise in demand for diesel. Figures for 2006 and 2007 can be taken from TABLE 6 below.

in 1000 t	**2007**	**2006**	**% change**
Gasoline	1.966	1.992	-1.3%
Diesel	6.321	6.174	2.4%

TABLE 6: AUSTRIAN DEMAND FOR DIESEL AND GASOLINE

5.1.2. Transport

Austria's crude oil supply is dependent on a single pipeline, the AWP Adria-Wien pipeline that ends at the Schwechat refinery. The TAL (Transalpine Pipeline) starts in Trieste, Italy, and is fed by tankers equipped with a tankage of up to 280,000 tons. Crossing the Alps, in Würmlach, Carinthia, the AWP then branches off.

Austria's supply with fuel oil, petrol and diesel is ensured directly by tank lorries and tank wagons from Schwechat refinery for eastern Austria and by a product pipeline ending in Sankt Valentin, Lower Austria, where large storage deposits are located. Western Austria is supplied, at least as far as OMV is concerned, from the Bayernoil refineries in Ingolstadt, Germany by tank lorry. Vienna International Airport is supplied with kerosene (JET A1) by a pipeline from the neighbouring refining site.

PLW

PLW is the abbreviation of the OMV-owned product pipeline to St. Valentin in Lower Austria. It makes it possible to deliver to parts of Western Austria and neighbouring foreign markets (Germany and the Czech Republic). Its nameplate capacity amounts to 1.3 m tons of products per year.

5.1.3. Storage Deposits

Many storage deposits in Austria, be it for storing crude oil or for storing products, are operated by ELG (Erdöl-Lagergesellschaft m.b.H.). ELG is a joint venture of OMV (55.6%), and the Austrian subsidiaries of BP (23.1%), Shell (16.7%) and Agip (4.6%). The list below is not exhaustive as there are various other deposits belonging to major as well as to non-major oil firms.

Fürnitz and Zirl (Agip/ ENI),

Both tank farms for products ensure the supply for Agip's businesses throughout the whole country.

Korneuburg

Owned by MOL, capacity exceeds 1000m³

Sankt Valentin

Deposit for products arriving by the PLW pipeline from the Schwechat refinery, nameplate capacity: 375,000m³.

Graz

OMV owns a rather small 8,100m³ storage deposit that is to supply southern Burgenland, Hungary, Slovenia and Croatia. In addition to this, there are several other deposits in and around the city, run by ELG.

Lannach

In Lannach, Styria, a large storage facility for crude oil is located. It is run by ELG and its tankage comprises 525,000 m³. Substantial shares of the legally determined minimum reserves are stored in Lannach; the tank farm is linked to the AWP pipeline.

Innsbruck, Linz

Tank farms located in these cities are both operated by ELG, there are additional ones run by majors on their own behalf.

Lobau

The tank farm situated to the east of Vienna in close proximity to the Viennese harbour consists of 87 tanks that can contain up to 1.6 m m³ of predominantly semi-finished products. The tank farm Lobau is directly connected to the Schwechat refinery via pipes; products are blended on site to become motor fuels. The finished

products are forwarded via tank ships and tank wagons. The tank farms in Lobau are owned by OMV and some by Shell Austria.

Lustenau

Wholly owned by OMV, its task is to provide fuel for customers in Vorarlberg. It is supplied by tank wagon from the deposit in Lobau, from Germany, Belgium and the Netherlands. The capacity amounts to 5,740 m³.

Salzburg

Run by TBG Tanklager Betriebsges.m.b.H., a joint venture of BP, Esso and Shell's Austrian subsidiaries. The three firms have an equal stake. >1000m³

Trofaiach

Run by Danuoil, a subsidiary of Roth. MOL holds 50% of the equity.

5.1.4. Conclusions for Austria

The dominant position of OMV concerning refining is easy to recognize: all refining that is done within Austrian borders is done on behalf of OMV. In 2004 a study had been commissioned to investigate if there was any evidence of OMV's dominant position jeopardising competition on wholesale and retail markets. No such evidence was found and prices have been closely monitored by the government since then.

Moreover there have been payroll processing contracts of majors[18] participating in the construction of the AWP pipeline. From 1970 on OMV processed crude oil on behalf of the majors using so-called payroll processing contracts. The share produced for the majors accounted for 15% of total production; they had a contingent of 2 m tons per year.

At the end of 2002 the payroll processing contracts of Agip, BP, Esso and Shell had with OMV expired. The ending of these contracts gave the OMV the chance of gaining greater flexibility but it also exposed the firm to stronger competition. Products that had been forwarded to the west towards the retail outlets of the majors were now imported from nearby foreign refineries.

Regarding demand for the separate products, Austria is highly dependent on imports of middle distillates, particularly on diesel. Austria has one of the highest ratios of diesel driven cars in the world, with respect to the total number of cars declared. As the yield in diesel that can be achieved even after conversion cannot be enlarged to any extent, a certain amount has to be produced in other refineries.

Given that the country is favourably located with respect to transport and surrounded by refineries in the neighbouring countries, a quite competitive environment prevails

[18] EC merger decision: Fall Nr. COMP/M.1819 -RHEINBRAUN / OMV /COKOWI

in retailing as well as in wholesaling. About half of OMV's production is sold to other retailers, including the majors on a non-retail basis. This surely intensified competition, at least when it comes to retailing. Even if there are substantial amounts sold on a wholesale basis from the OMV to other oil majors, the abundance of those contracts allowed other companies engaged in retailing to keep an eye on the purchase prices they can get. They could meet their demand for their Austrian subsidiaries either from the OMV or import from nearby refineries they own. A significant increase in imports to Austria for 2004 supports this theory.

The left axis in FIGURE 4 gives imports in m tons. The right-hand side measures the percentage change from the preceding year, with the value being indicated by the blue line. After the expiration of payroll processing contracts Agip, BP, Esso and Shell were to decide if they continue purchasing at OMV or import fuels from their own refineries. The latter seems to be true as the change in import amounts from 2002 to 2003 accounts for almost 25%. This is the highest increment from one year to the other; otherwise the changes are oscillating between -5% and +12%.

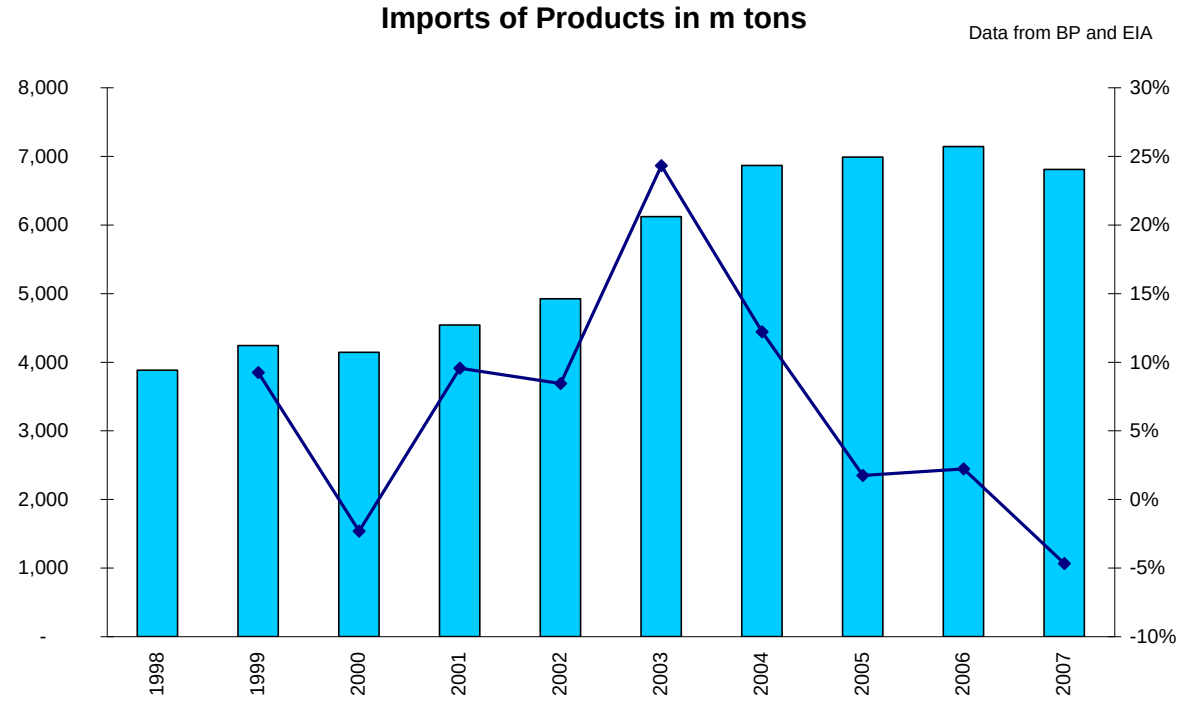


FIGURE 4: AUSTRIAN IMPORTS AND CAPACITY

As 67% of the motor fuels have been sold over service stations, I find it reasonable to dip into the Austrian retail market. The statistics for service stations of the Austrian Federal Economic Chamber (WKO) beneath outline the situation. OMV has by far the most outlets in Austria, followed by BP and Shell, the outlets are listed in TABLE 7 below.

Brand	#
BP	463
OMV[19]	707
Shell	284
Agip	183
Esso	177
JET	142
MOL	13
…	…
TOTAL	2802

TABLE 7: SERVICE STATIONS IN AUSTRIA

Entry into the Austrian refining market is unlikely, crucial supply with crude oil would require the construction of a new pipeline. This would further boost the already enormous investments that would have to be made. A potential entrant would have to fight with OMV for the crude oil transported by the AWP pipeline or would have to initiate the bypass to the neighbouring Druzhba pipeline, let alone the enormous investments that would have to be made.

Building the link to the Druzhba pipeline may be a risky game in the medium term. Russia is looking to avoid delivering their oil through Belarus and Ukraine after several conflicts about transit fees and is building a new oil pipeline, ending near Saint Petersburg in the Baltic Sea. In fact it is an extension of the Baltic Pipeline System (BPS) from Kirishi, which is 115 km south of St. Petersburg, to the harbour on the coast of the Baltic Sea in Primorsk. The extension of the BPS is expected to be completed in September 2012[20]. At this time, a significant decline in volumes delivered through Druzhba can be expected – Russia simply saves money by doing so.[21] [22]

Furthermore, the profitability of importing refined products from abroad decreases as distance increases and becomes rather expensive if no transport by rail is possible. Transport in tank wagons is the most reasonable in terms of cost/per ton, ranking just behind transport by tanker/barge.

Despite the fact that the majors own storage deposits they can supply from abroad, OMV owns the tank farm Lobau, located next to Vienna's domestic port on the Danube. ELG, which runs many of the deposits in Austria, including the largest – the deposit in Lannach – is majority-controlled by OMV. All these facts draw a picture of

[19] Including Avanti and Genol (joint venture with Raiffeisenware Austria, RWA) gas stations
[20] Reuters UK, "Transneft to start work on new Baltic oil pipeline", 26.05.2009
[21] According to Johannes Benigni, Manager at PVM Oil Associates
http://www.localglobal.de/sixcms/detail.php?id=769559&template_id=3724"
[22] "Baltic Pipeline System Set To Reduce Transit Dependency", The Saint Petersburg Times, 11.04.2006

a quite dominant position of OMV in the wholesale of refined products, at the same time being in close proximity to foreign located refineries owned by competitors.

5.2. Germany

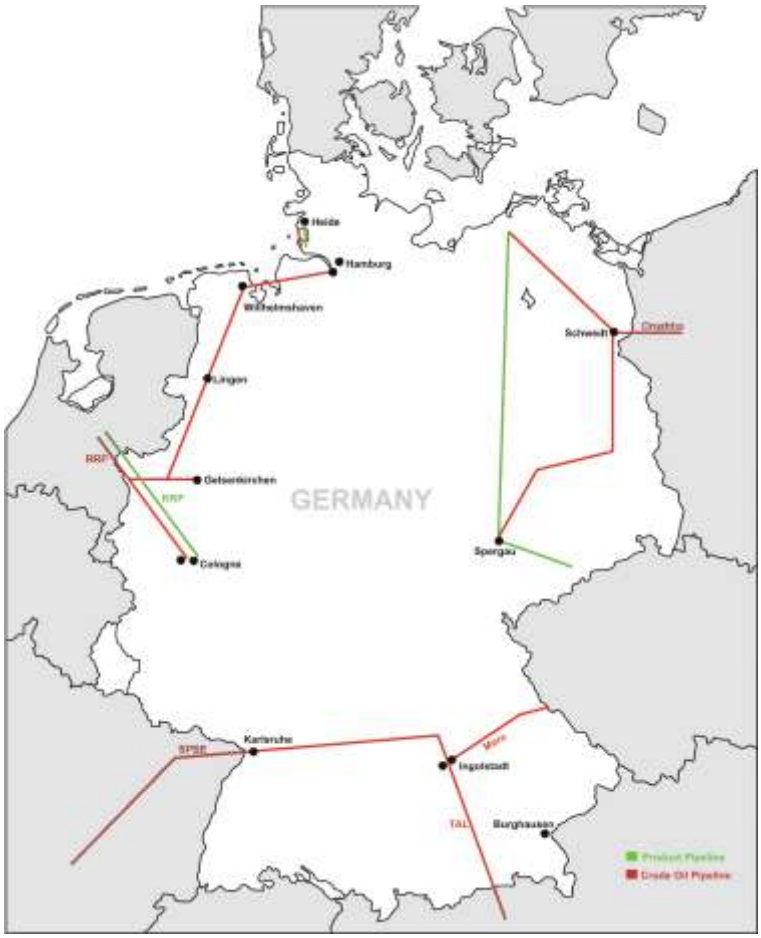


FIGURE 5: GERMANY

The average citizen in Germany consumes about 1,900 litres of crude oil per year – total oil consumption accounted for 108.1 m tons in 2007, with refining capacity totalling 119 m tons. German imports of crude oil amounted to 107 m tons, 34 m tons of which came from Russia – a third of demand - and 17 m tons from Norway. Great Britain delivered 14 m tons, Libya 11 m and Kazakhstan 8 m tons. Domestic production of crude oil accounted for 3.4 m tons – which is 3% of total demand and therefore rather negligible.

The demand for products is covered by a quarter to a third by imports from abroad. The German refining market has been exposed to several challenges in the past. After the first oil crisis in 1973/1974, German refineries had to absorb failures in imports. Having an all time high of 149 m tons of crude oil consumption in 1979, Ger-

many's demand for oil was decreasing due to efforts to save and substitute. In 1989 demand in West Germany amounted to merely 118 m tons. After the German reunification, it then increased to 132 m tons in 1996 from which point it began to decline again.

Shrinking demand after the second oil crisis and excess capacity in the refining industry led to huge problems with operating rates: Total nameplate capacity was 159 m tons in 1978, while in 1982, West German refineries had been using only 57% of their capacity. The number of refining sites had to be reduced radically; in 1990 capacity amounted to merely 80.6 m tons per year. At the same time, the German refining industry was faced with the same challenges as the rest of European sector was: Growing demands for lighter products, especially for motor fuels and feedstock for the chemical industry, at the expense of heavy fuel oil. Conversion plants had to be built to meet the demands of the market. The modification of the industry seems to have worked: Imports have been on the decline steadily since 1997.

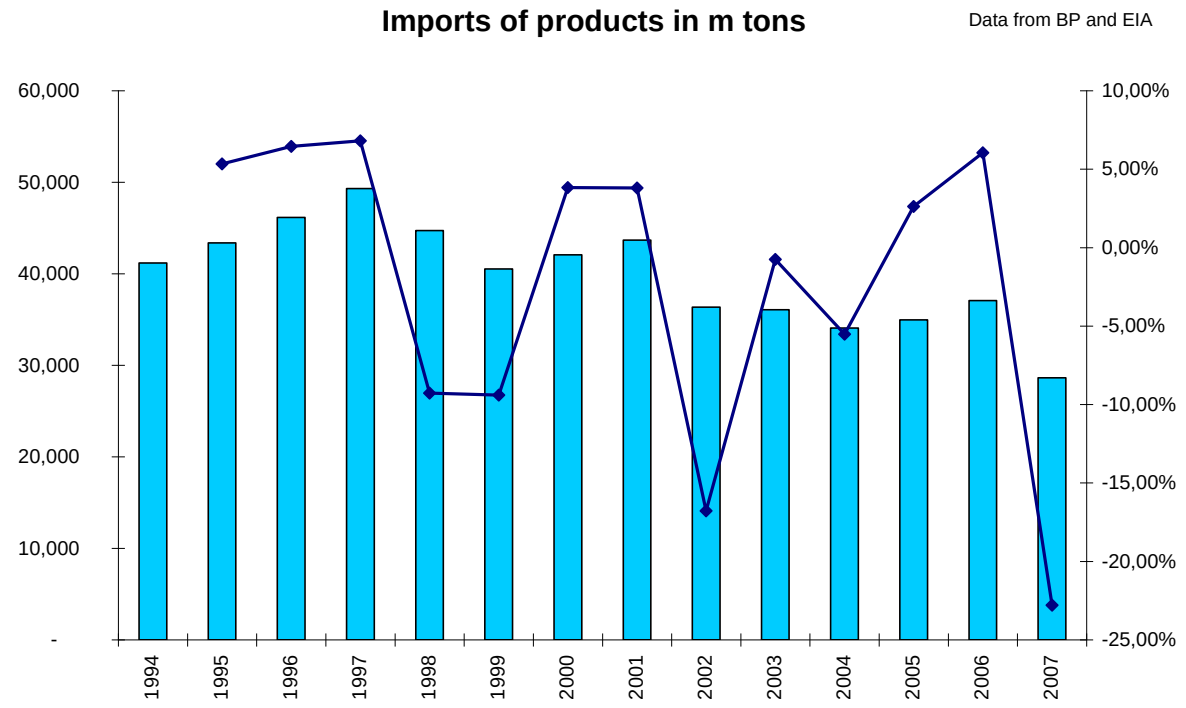


FIGURE 6: GERMAN IMPORTS ABSOLUTE AND CHANGES

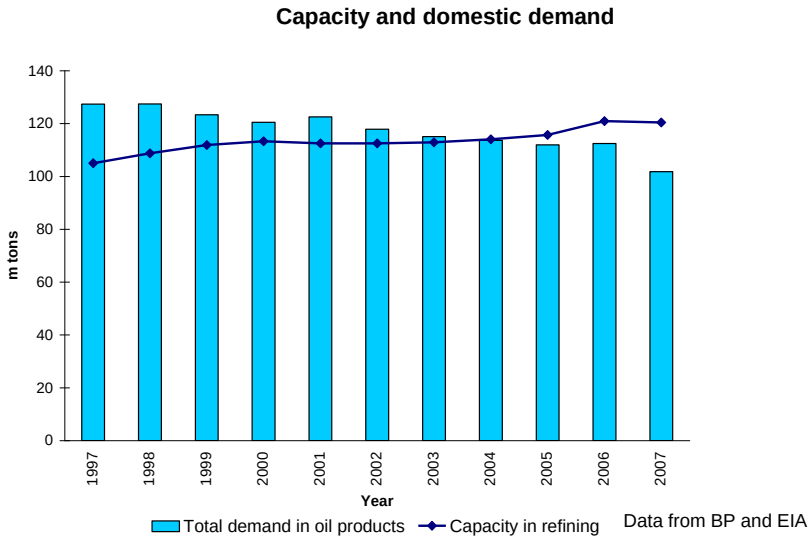


FIGURE 7: GERMAN CONSUMPTION AND CAPACITIES

	in m tons
Benelux	5,886
Austria	3,967
UK	2,791
France	2,091
Poland	2,287
…	
Czech Republic	1,055
Slovakia	0,06
Hungary	0,05

TABLE 8: GERMAN EXPORTS OF OIL PRODUCTS

FIGURE 6 shows the development of imports in absolute values and percentage points. FIGURE 7 gives the trends of total demand and domestic crude oil distillation capacity. Any excess capacity from German refineries, about 10 m tons per year, is exported – such exports consist of diesel, heavy fuel oil and petrol for the most part. Export figures doubled in the period from 1996 to 2007, reaching a level of 28 m tons. Exports were mostly to the Benelux states, Austria, UK and France. Additional numbers can be taken from TABLE 8 on the right. The Elzinga-Hogarty test with the threshold will get calculated below.

5.2.1. Refining

In 2007, 14 crude oil refining sites were in operation in Germany and the capacity utilization ratio was 91.7%. TABLE 9 provides the details.

Company	Refining sites	Nameplate capacity in m tons	Share in equity in %	Location	Distillation Capacity in m tons	Total	Market share in %
OMV	Bayernoil	12.00	45.00%	Ingolstadt	5.40		
	Burghausen	3.40	100.00%	Burghausen	3.40	8.80	7.39%
Shell	MIRO Mineraloel-raffinerie	14.90	32.25%	Karlsruhe	4.81		
	Rheinland Refinery	17.00	100.00%	Cologne	17.00		
	Refinery Ham-burg-Harburg	5.10	100.00%	Hamburg	5.10		
	PCK Refinery	12.00	37.50%	Schwedt	4.50		
	Erdölwerk Holstein	4.50	100.00%	Heide	4.50	35.91	30.16%
BP	Emsland Refinery	4.00	100.00%	Lingen/Ems	4.00		
	PCK Refinery*	12.90	18.75%	Schwedt	2.42		
	Bayernoil	10.00	22.50%	Ingolstadt	2.25		
	MIRO Mineraloel-raffinerie	14.90	12.00%	Karlsruhe	1.79		
	Ruhröl Refinery	12.90	50.00%	Gelsenkirchen	6.45	16.91	14.20%
Tamoil	Holborn Europa Refinery	4.65	100.00%	Hamburg	4.65	4.65	3.91%
ConocoPhillips/JET	Wilhelmshaven Refinery	13.50	100.00%	Wilhelmshaven	13.50		
	MIRO Mineraloel-raffinerie	14.90	18.75%	Karlsruhe	2.79	16.29	13.69%
TOTAL	Mitteldeutschland Refinery	12.00	100.00%	Spergau	12.00		
	PCK Refinery**	12.00	12.50%	Schwedt	1.50	13.50	11.34%
Agip/ENI	Bayernoil	12.00	20.00%	Ingolstadt	2.40		
	PCK Refinery**	12.00	12.50%	Schwedt	1.50	3.90	3.28%
PDVSA	PCK Refinery*	12.90	18.75%	Schwedt	2.42		
	Ruhröl Refinery	12.90	50.00%	Gelsenkirchen	6.45		
	Bayernoil	12.00	12.50%	Ingolstadt	1.50	10.37	8.71%
Esso/ExxonMobil	MIRO Mineraloel-raffinerie	14.90	25.00%	Karlsruhe	3.73	3.73	3.13%
Petroplus	Ingolstadt Refinery	5.00	100.00%	Ingolstadt	5.00	5.00	4.20%
TOTAL					**119.05**	**119.05**	**100.00%**

*Shares held via RuhrOel:JV of BP and PDVSA in equal shares
**AET Betges.: Joint Venture of Total and Agip assume: JV shares held in equal shares

TABLE 9: GERMAN REFINERIES

Obviously Shell is the clear market leader in refining with a market share of 30.16%, at least within German borders. Thereon follows BP with a market share of 14.2% and ConocoPhillips. OMV, which holds a dominant position in Austria, is among the also-rans. However, serious conclusions can not be drawn until market shares for the whole geographic area are calculated, as the market for refined products is supposed to be a cross-national one.

Firstly, I will briefly consider foreign trade in refined products and the structure of German demand in products, listed in TABLE 10

Domestic production vs. Imports 2007					
	Domestic production		Imports		Total
	in t	in %	in t	in %	in t
Liquefied Petrol Gas	3,065,000	81.9%	679,000	18.1%	3,744,000
Gasoline					
Naphtha	8,207,000	53.1%	7,236,000	46.9%	15,443,000
Petrol	24,289,000	94.4%	1,442,000	5.6%	25,731,000
Petrol components	2,054,000	85.6%	345,000	14.4%	2,399,000
Refinery gas	4,166,000	100.0%	-	0.0%	4,166,000
Special gasoline	-	0.0%	34,000	100.0%	34,000
White Spirit	-	0.0%	30,000	100.0%	30,000
Middle distillates					
Kerosene	2,000	11.1%	16,000	88.9%	18,000
Turbine fuel	4,592,000	49.8%	4,626,000	50.2%	9,218,000
Diesel	35,320,000	91.8%	3,137,000	8.2%	38,457,000
Middle distillate components	611,000	31.7%	1,318,000	68.3%	1,929,000
Fuel oil light	14,826,000	75.3%	4,858,000	24.7%	19,684,000
Fuel oil heavy	11,967,000	90.4%	1,271,000	9.6%	13,238,000
Fuel oil heavy components	1,702,000	56.0%	1,336,000	44.0%	3,038,000
Other					
Lubricants	2,431,000	75.2%	801,000	24.8%	3,232,000
Bitumen	3,500,000	90.0%	390,000	10.0%	3,890,000
Other	3,632,000	76.7%	1.102,000	23.3%	4,734,000
TOTAL 2007	**120,364,000**	**80.8%**	**28,621,000**	**19.2%**	**148,985,000**
TOTAL 2006	*122,082,000*	*76.7%*	*37,075,000*	*23.3%*	*159,157,000*

Source: MWV "Jahresbericht Mineralöl-Zahlen 2007"

TABLE 10: GERMAN DOMESTIC PRODUCTION AND IMPORTS 2007

Import shares are calculated with respect to domestic production instead of domestic demand or consumption. Calculation differences arise between inland production, adding imports and deducting exports. There are cases where exports exceed the sum of production and imports, while positive demand occurs. In any case, the method employed gives the same results as the alternative way without causing problems. I will keep it this way for all the other countries to follow.

LIFO		
	2007	**2006**
	0.85	0.80
LOFI		
	2007	**2006**
	0.77	0.78

TABLE 11: GERMANY, LIFO&LOFI VALUES

The LIFO and LOFI values calculated in TABLE 11 above indicate that is almost self-sufficient with regard to refined products. Although it cannot be regarded as a market on its own, the country's exports represent a vital supply for neighbouring countries like Austria. In addition to this, the LOFI value, regarding the importance of exports, is below 0.8 and the EC regards countries with one of the thresholds below 0.9 as parts of a cross-national market. As a country with many refineries, Germany is certainly less dependent on the imports of oil products as Austria is, for example. However, there are some products of which substantial amounts have to be brought into the country.

Omitting smaller amounts of special feedstock – white spirit for example – naphtha, turbine fuels, middle distillate components and components for heavy fuel oil rank are among the list of oil products that get imported on a significant scale.

The Netherlands is the main country of origin of German imports in products. In 2007 16.2 m tons was imported by Germany, mainly naphtha, turbine fuel, gasoline and light fuel oil, but also considerable amounts of diesel.

Belgium/Luxemburg share the second place, with imported amounts totalling 3.9 m tons, followed by Great Britain and France.

Imports from Austria, Italy, Slovakia and Hungary do not show up on a large scale, though exports may.

5.2.2. Transport

More than half of the products are transported by inland water transportation. Germany possesses a dense network of waterways and rivers. The other part of transport of bulk loads is done by rail. Service stations and other smaller retailers clearly get supplied by road transport. Crude oil is forwarded almost exclusively by pipeline; an increasingly small percentage is transported by rail.

Crude oil pipelines

Crude oil is transported almost exclusively by pipeline (98.9% in 1997), at least as far as domestic transportation is concerned. This invites the conclusion that German oil processing sites are either located by the sea or big rivers, where they get directly supplied by large tankers delivering crude oil from abroad or they are supplied via pipelines. The routes of the main pipelines are shown in FIGURE 5 at the beginning of section 5.2.

Germany is supplied with crude oil through four main axes:

- SPSE from Fos-sur-Mer, close to Marseille
- TAL (Trans Alpine Pipeline) from Trieste
- Druzhba from Danzig and Adamowo (BLR)
- RRP from Rotterdam

TAL is a joint venture of several oil companies[23] supplying southern refineries: Burghausen, Ingolstadt and Karlsruhe. It has a capacity of up to 42 m tons per year.

SPSE (Société du Pipeline Sud-Européen) supplies Karlsruhe in the south-west; this is also a joint venture of several majors (TOTAL, BP, Shell and others). The shareholder structure in detail is listed in the "Fundamental Terms" section at the beginning.

Druzhba ("Friendship") starting in Samara, north of the Caspian Sea, splits in Belarus into two branches: The northern one passes Belarus, crosses Poland and ends in Germany, while the southern one takes a route through Ukraine supplying the Czech Republic, Hungary and the Balkan states. The operator of the pipeline is the state-owned Russian company Transneft, the world's largest pipeline system operator. The refineries in Spergau and Schwedt, both in eastern Germany receive their feedstock though this way.

RRP (N.V. Rotterdam-Rijn Pijpleiding Maatchappij) has the following shareholder structure: Shell Petroleum N.V. 40%, Ruhr Oel GmbH[24] 20%, BP 20%, Shell Deutschland Oil GmbH 10%, Texaco Nederland B.V. 10%. The pipeline supplies the west of Germany – the refineries in Cologne.

NWO Nord-West-Oelleitung GmbH NDO

The 391-km long pipeline transports crude oil from the harbour of Wilhelmshaven to Cologne-Wesseling and ensures the supply of oil to 4 refineries.

Shareholders are Ruhr Oel GmbH 33.69%, BP 25.64%, Shell 20.40% and the Holborn Europa Refinery, which belongs to Tamoil, with 20.27%. The NWO operator is also in charge of the NDO Norddeutsche Oelleitung that runs from Wilhelmshaven to Hamburg. Wilhelmshaven is supposed to be the deepest German industrial harbour. Most of the crude oil imported to Germany gets into the country in Wilhelmshaven: About 32 m tons per year compared to only 4.4 m tons from Hamburg.

[23] OMV 25%, SHELL 24%, ExxonMobil 16%, RuhrOel 11%, ENI 10%, BP 9%, ConocoPhillips 3%, Total 2%

[24] Joint venture of BP and PDVSA, a Venezuelan oil company

Norddeutsche Oelleitungsges. mbH

A wholly owned subsidiary of the Holborn Europa Refinery, thus the refinery owned by Tamoil is fully supplied from Wilhelmshaven.

MVL

MVL acts on behalf of the chemical industry and takes part in supplying the refineries in Spergau (Mitteldeutschland Refinery of TOTAL, holding 55%) and Schwedt (PCK Refinery holds 45%) with feedstock from the Druzhba pipeline.

MERO

The operator of the MERO pipeline is a German subsidiary of its Czech mother, a company wholly owned by the Czech Republic's treasury department. It branches of the TAL in Bavaria and supplies the main tank farm in Nelahozeves near Prague.

Product pipelines

RRP

The crude oil pipeline from Rotterdam consists of pipes that are used for pumping products into Germany and importing them in the most efficient way. It feeds into the RMR pipeline when crossing the German border.

RRB

Rohrleitung Rostock-Böhlen supplies a variety of oil products from Spergau to Rostock.

CEPS

Its full name is "Central European Pipeline System" and is owned by NATO. Its original purpose was to ensure the supply of NATO troops with turbine fuel, petrol and diesel. Furthermore, it supplies German airports through providing a direct connection between for example Frankfurt airport and the BP refinery in Lingen. Moreover, it connects Germany, France, Belgium, Netherlands and Luxembourg. It is operated – at least throughout Germany – by FBG Fernleitungsgesellschaft mbH, which appearsto be under control of the Federal State.

NEPS

The above-mentioned FBG also manages the North European Pipeline System which connects Germany and Denmark. It has the same objectives to meet as CEPS; both are also supposed to connect several NATO tank farms to guard reserves for military purposes.

RMR Rhein-Main-Rohrleistungstransportgesellschaft mbH

This connects Ingolstadt, Frankfurt and Cologne, supplying them with products from Pernis, Rotterdam. The RMR pipeline starts at the German border to the Netherlands. It can be considered the German stage of the RRP pipeline from Rotterdam.

MIPRO

Mitteldeutsche Produktenleitung Leuna-Hartmannsdorf, works on behalf of the Refinery Mitteldeutschland of TOTAL. Hartmannsdorf is a location of tank farms for products.

PCK

Has its origin at the PCK refinery in Schwedt and takes its route to Seefeld with an annual capacity amounting to 3.8 m tons.

Furthermore there are product pipelines like the Ruhr Oel pipeline from Gelsenkirchen to Duisburg, a Shell pipeline from the refinery in Heide back to Brunsbüttel, the origin of the oil it processes. OMV operates product pipes from Burghausen to Munich via Feldkirchen.

5.2.3. Storage Deposits

Each refinery is supposed to have storage facilities either for crude oil or for processed oil. When combined with tank farms in pipeline terminals, they achieve a capacity of 24 m m³ or approximately 17 m tons or 17% of demand in 2007. It can be assumed that the latter tank farms are shared by their owners among the shareholder structure of the pipeline operator or the refining site. The storage deposit in Wilhelmshaven alone can capture 1.6 Mio m³ of liquids.

Storage deposits exceeding 1000 m³ External tank farms[1)] by federal states	**in 1000 m3 2006**
Schleswig-Holstein	1702.4
- share stored in caverns	1582.2
Hamburg	2196.4
Niedersachsen	22392.5
- share stored in caverns	21442.4
Bremen	1911.3
- thereof caverns	1213.4
Nordrhein-Westfalen	6562.5
- share stored in caverns	3161.2
Hessen	1091.9
Rheinland-Pfalz	1749.1
Baden-Württemberg	1409.6
Bayern	1566.4
Saarland	4.0
Total-Berlin	1044.8
Mecklenburg - Vorpommern	1258.9
Brandenburg	364.5
Sachsen-Anhalt	68.6
Sachsen	514.5
Thüringen	576.7
Total storage capacity in external tank farms	44414.1
in refineries and terminals 2)	24031.2
Total	68445.3
[1)]Tank farms outside of refineries and processing sites	

TABLE 12: GERMANY, STORAGE DEPOSITS[25]

FIGURE 8: GERMANY, STORAGE DEPOSITS[26]

[25] Table from MWV "Jahresbericht Mineralöl-Zahlen 2007" p. 36

26 Figure from MEW (Mittelständische Mineralöl- und Energiewirtschaft Deutschland e. V.) "Jahresbericht 2007" p.77

Looking at TABLE 12 and FIGURE 8, it is easy to see that Lower Saxony has the largest number of storage facilities for oil and oil products. Altogether, Germany has facilities that can store more than half of the country's annual consumption. Crude oil mostly gets stored in caverns (large natural or man-made excavations beneath the surface), while products are usually stored in tanks above the surface – they have to be easily accessible. The deposits are generally supplied by river boats or tank wagons and in some cases through pipelines directly from refining sites. EBV, a public entity, has every oil company operating in Germany as a member. It manages tank farms all over Germany, accounts for about 21 m tons of oil and oil products stored and monitors the minimum reserve system as defined by law. The minimum reserve has to cover 90 days of German consumption; in actual fact the reserves exceed this value by far.

Independent tank farm operators that sell the rights to use their infrastructure play an important role when it comes to securing supply and storing reserves of the country, accounting for about 10 m m^3 of storage facilities throughout the country. These providers are organised in the "Unabhängiger Tanklagerverband e.V.". There are further numerous smaller tank farms of medium-sized firms trading with oil products.

5.2.4. Conclusions for Germany

Germany experienced a lot of structural turmoil in the refining industry – history. The German refining market has been hit by several demand shocks after the Second World War. Exploding demand – demand in 1950 was eight times what was available until 1960 – made fast expansion necessary. This policy in turn led to deteriorating capacity utilization rates and capacities had to be cut down again. German reunification in 1990 again caused reorganization of the sector. Until 1993, even the transport business was highly regulated with licensing and allocation of transport rights and regulation of prices. Nowadays Germany's refining industry is a quite modern sector, still subject to strict regulation but primarily with regards to environmental issues. 10 firms are engaged in running refineries.

There are close ties with the Netherlands, from where significant amounts of crude oil and products ready for consumption are imported. Germany exports substantial amounts of products, in particular relative to the sizes of the target countries, to Austria and the Czech Republic. Despite Benelux states, France and Great Britain do not lie in the focus of this work, one can not ignore Germany's active business operations with these countries.

The market is dominated by large international and vertically integrated companies able to exploit economies of scale and scope. This constitutes an obstacle to enter the market. Buyer power can be assumed to be bigger with large, internationally act-

ing companies, most notably when it comes to purchasing crude oil on the international markets. Royal Dutch Shell is the leader in the refining sector, accounting for 30% of German production of refined products. Should any concerns arise about concentration, they may be related to the fact that Shell runs a refinery with a capacity of 21 m tons per year in Pernis, Rotterdam and sells significant amounts on the German market.

5.3. Italy

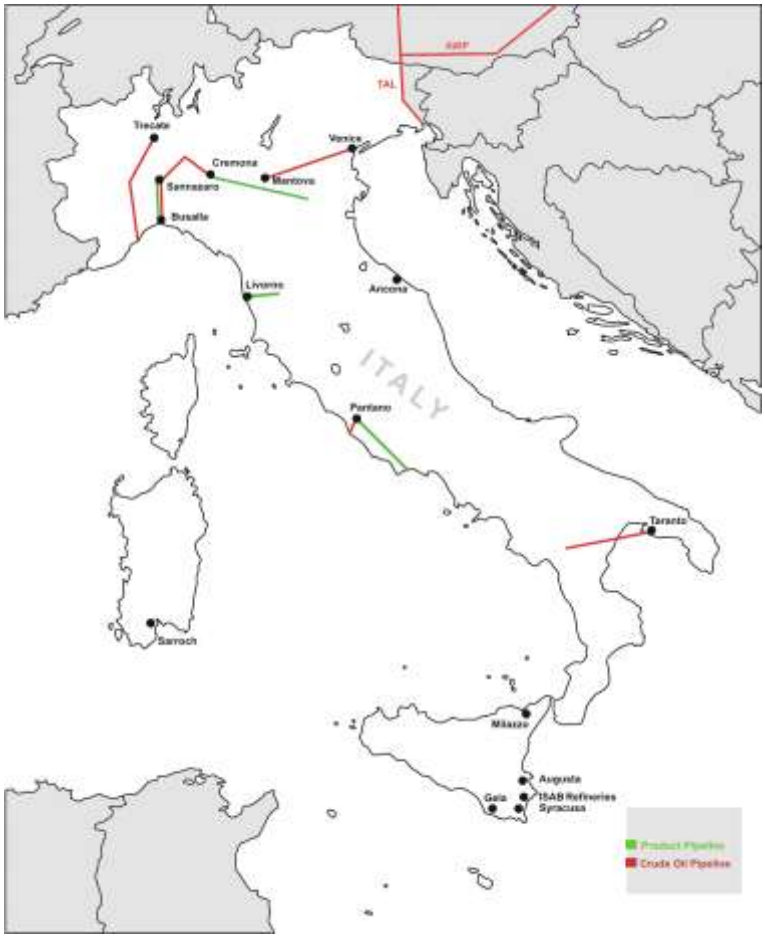


FIGURE 9: ITALY

Italy consumed 83.8 m tons of crude oil in 2007, the last decline of more than 3% is partly due to the fact that less oil was used to generate electricity. The usage of oil has been intensified as a consequence of a shortage of natural gas.

Crude oil imports in 2007 totalled 88.2 m tons. The number one crude oil supplier was Libya (25.8m tons). It was followed by Russia (16.5m tons) Iran, Iraq, Saudi Arabia and Azerbaijan.

5.3.1. Refining

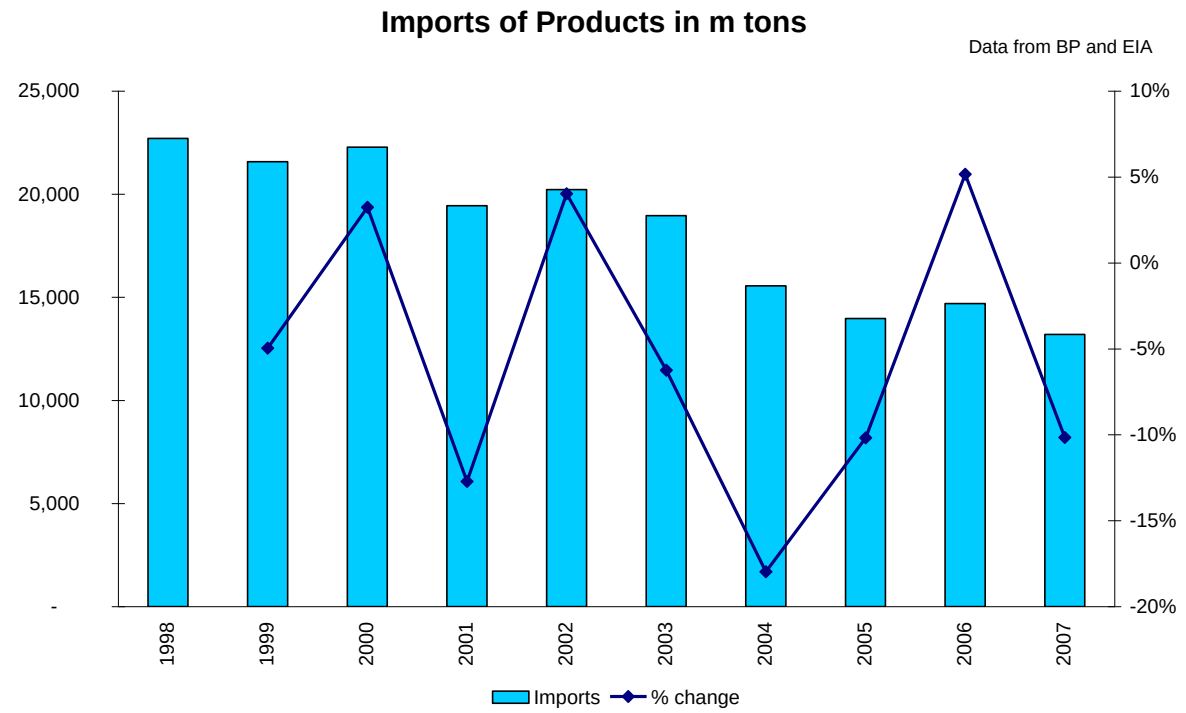


FIGURE 10: ITALIAN IMPORTS, ABSOLUTE AND CHANGES

It is easy to see in FIGURE 10 above that Italian refinery capacity exceeds domestic consumption. Furthermore, the two variables had shown opposite tendencies: While consumption is set to decline slowly capacity was still being extended until 2007. In any case, it is quite likely that a ceiling has been reached, given the international evolution of the refining industry and environmental regulation. Anyhow, it should be noted that in the 1970s, Italy had twice the number of refineries and almost double the capacity – parameters which had to be changed in order to meet the changes in demand patterns.

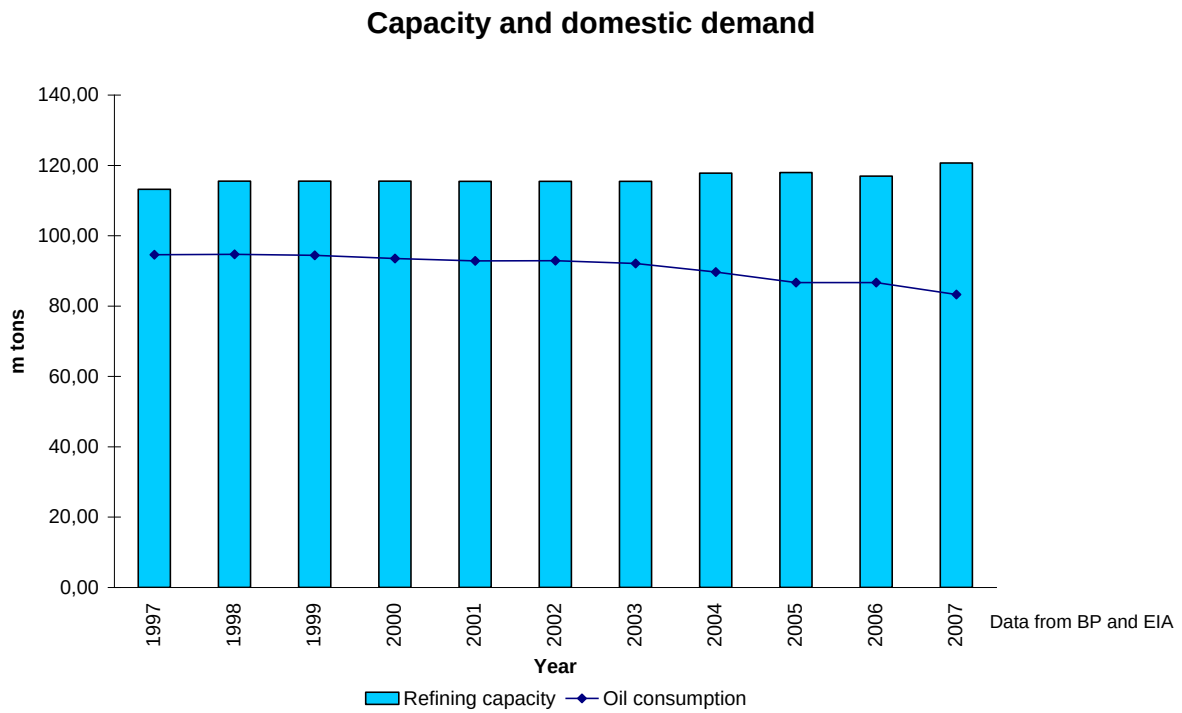


FIGURE 11: ITALIAN CONSUMPTION AND CAPACITY

Looking at the Italian refining market, one has to bear in mind that it was subject to price regulation by the federal state until 1994, at which time the market was fully liberalised.

As it is shown in FIGURE 11 ABOVE, Italy is in a comfortable position regarding the supply of refined products: The country can easily meet its domestic demand and export what is left; it is not dependent on large-scale imports. As we will see from TABLE 13 below, Italy mostly imports feedstock for its chemical industry and some light fuel oil.

According to the Unione Petrolifera[27], there are 16 refining sites in Italy, with an atmospheric distillation capacity of approximately 120 m tons per year. Two refineries with nameplate capacities between 6 and 11 m tons have been closed since 2006 and one large refinery with a capacity of more than 13 m tons has been commissioned. This fact follows the trend to a smaller number of refineries with greater production capabilities, something which points to considerable economies of scale.

In contrast to the countries dealt with before, Italy's refining industry is expanding in capacity, albeit shrinking in terms of the number of sites. Together with declining domestic consumption, an increasing amount of refined products are being exported. The country's good position in the Mediterranean Sea with many harbours and an

[27] The association of the Italian oil industry.

extensive coastline goes hand in hand with great accessibility for tankers from major North African crude oil exporters, tankers from the Arabian Peninsula or from the Black Sea.

In 2007 and 2008, the ISAB refineries, a joint venture of ERG and the Russian Lukoil was started up. The refinery offers substantial conversion capacity and concentrates on producing middle distillates while at the same time being flexible in crude oil feed-stock.

The construction of the ISAB refineries easily be inferred as being a part of a policy towards exporting refined products as the refineries obviously are not only designed to meet local demand.

Below the 16 (ISAB consists of two sites) refining sites are listed in TABLE 13 with ownership structure, capacities and provisional market shares.

Company	Refining sites	Nameplate capacity in m tons	Share in equity in %	Location	Distillation capacity in m tons	Total	Market share in %
Agip/ENI	Sannazzaro	8.50	100.00%	Sannazzaro	8.50		
	Venice	4.20	100.00%	Venice	4.20		
	Livorno	4.30	100.00%	Livorno	4.30		
	Taranto	5.50	100.00%	Taranto	5.50		
	Milazzo Refinery	9.80	50.00%	Milazzo	4.90		
	Gela	5.00	100.00%	Gela	5.00	32.40	30.48%
Esso/ExxonMobil	Augusta	8.80	100.00%	Augusta	8.80		
	Sarpom Refinery	8.75	75.40%	Trecate	6.60	15.40	14.48%
Tamoil	Cremona	4.50	100.00%	Cremona	4.50	4.50	4.23%
TOTAL	Rome Refinery	4.30	71.90%	Pantano	3.09	3.09	2.91%
ERG Petroli	Rome Refinery	4.30	28.10%	Pantano	1.21		
	Sarpom Refinery	8.75	24.60%	Trecate	2.15		
ERG MED*	ISAB Refineries	19.40	51.00%	Syracuse	9.89	13.25	12.47%
MOL	Mantova	2.60	100.00%	Mantova	2.60	2.60	2.45%
Saras SpA	Saras Refinery	15.00	100.00%	Sarroch	15.00	15.00	14.11%
Iplom	Iplom Refinery	1.75	100.00%	Busalla	1.75	1.75	1.65%
KNPC**	Milazzo Refinery	9.80	50.00%	Milazzo	4.90	4.90	4.61%
APIOIL	Api Refinery	3.90	100.00%	Ancona	3.90	3.90	3.67%
Lukoil	ISAB Refineries	19.40	49.00%	Syracuse	9.51	9.51	8.94%
TOTAL					106.30	106.30	100.00%

*100% subsidiary of ERG
**Kuwait National Petroleum Co.
Source: Unione Petrolifera

TABLE 13: ITALIAN REFINERIES

What is astonishing about the ownership structure of Italian refining sites is that a number of them belong to rather small companies or can be considered as being privately run. Saras, Iplom and API are small entrepreneurial entities accounting in total for about 20% of the country's refining capacity. Saras SpA, controlled by the Moratti family, alone accounts for almost 15%. The picture drawn by the Italian industry provides evidence that also small entities can prevail in an industry subject to significant economies of scale

Besides, the industry structure resembles somewhat the German picture. One firm, ENI is leading the way, with a 30% share of Italian refining capacity. ENI is followed by ExxonMobil, ERG and Saras SpA, all holding market shares between 10 and 15%. At last there are several smaller players beneath the 10% mark.

The reader has to bear in mind, that the geographic definition of the market will presumably not include all refineries in the south of Italy given that they may not be part of the defined geographic market. The country lacks suitable means of mass transportation of oil products from the south to the north.

However for reasons of clearness and completeness, all refining sites are cited in the table above. On the other hand, ENI holds interests in several German and Czech refineries, so matters will not become clear before market shares for the defined geographic have been calculated. This will be the next step after having analysed each country separately. FIGURE 12 describes the output structure of Italy's refineries

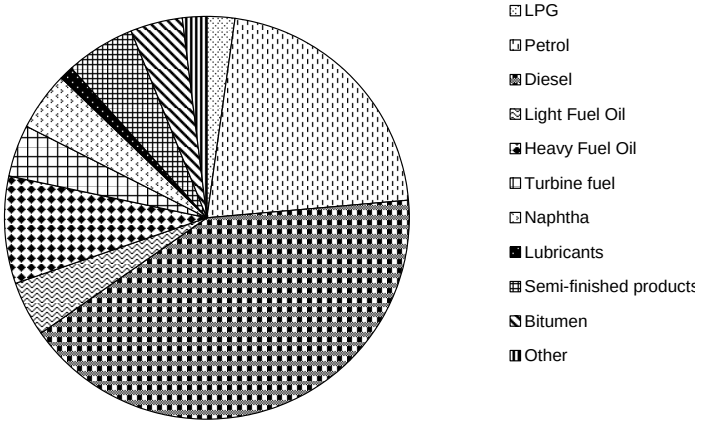


FIGURE 12: OUTPUT STRUCTURE OF ITALY'S REFINERIES

	% of output
LPG	2.10%
Petrol	19.10%
Diesel	37.50%
Light Fuel Oil	4.20%
Heavy Fuel Oil	7.60%
Turbine fuel	3.90%
Naphtha	4.07%
Lubricants	1.20%
Semi-finished products	5.00%
Bitumen	3.60%
Other	1.80%
Refinery consumption	10.10%
	100.00%

TABLE 14: OUTPUT STRUCTURE OF ITALY'S REFINERIES

The reader can easily spot the emphasis that lies on the production of motor fuels. Year after year, ever more diesel-driven cars are bought, while at the same time the number of cars using petrol is slowly declining. This trend dictates that additional capacity is created to achieve higher yields for middle distillates.

Domestic production vs. Imports 2007					
	Domestic production		Imports*		Total
	in t	in %	in t*	in %	in t
Liquefied Petrol Gas	2,255,000	60.3%	1,483,000	39.7%	3,738,000
Gasoline					
Petrol	20,101,000	98.7%	258,000	1.3%	20,359,000
Naphtha	4,072,000	64.4%	2,249,000	35.6%	6,321,000
Middle distillates					
Turbine fuel	4,135,000	83.7%	807,000	16.3%	4,942,000
Diesel	39,561,000	96.7%	1,332,000	3.3%	40,893,000
Fuel oil light	4,388,000	72.1%	1,695,000	27.9%	6,083,000
Fuel oil heavy	8,079,000	92.8%	626,000	7.2%	8705,000
Other					
Refinery cons. & losses	10,648,000				
Semi-finished products	5,255,000	41.0%	7,560,000	59.0%	12,815,000
Lubricants	1,252,000	83.7%	243,000	16.3%	1,495,000
Bitumen	3,773,000	99.9%	5,000	0.1%	3,778,000
Various	1,865,000	29.4%	4,469,000	70.6%	6334,000
TOTAL 2007	**105,384,000**	**83.6%**	**20,727,000**	**16.4%**	**126,.111,000**
TOTAL 2006	*104,388,000*	*83.2%*	*21,023,000*	*16.8%*	*125,411,000*
Source: Unione Petrolifera	*Figures for imports are declared being provisional				

TABLE 15: ITALIAN DOMESTIC PRODUCTION AND IMPORTS 2007

Both for petrol and for diesel fuel no significant import shares are evident. The country is dependent on imports of naphtha and semi-finished products that represent important feedstock for the chemical industry. The picture drawn by the figures in TABLE 15 above does not come by surprise, as we have seen at the beginning of the chapter that Italy has a surplus of refining capacity in respect of demand.

Exports

Italy exports considerable amounts of petrol, diesel and fuel oil. TABLE 16 gives the main recipients of petrol in Europe are Belgium and Spain claiming 38.9% of Italian exports to Europe. But there are also almost 2 m tons of petrol that get exported to the USA, this may be an indication of what in fact is economically sensible. Shipment costs obviously do not play a major role.

Italy's exports to Europe					
in thousand tons					
Countries	**Petrol**	**Diesel**	**Fuel Oil**	**Total**	**% of exports**
Austria	101	463		564	3.9%
Belgium	655	441	671	1,767	12.1%
France	36	613	15	664	4.5%
Germany				-	0.0%
Greece	210	498	118	826	5.6%
Malta	36	164	787	987	6.7%
Portugal				-	0.0%
Great Britain	51	11	62	124	0.8%
Romania		91		91	0.6%
Spain	575	4,954	165	5,694	38.9%
Switzerland	371	406	9	786	5.4%
Turkey	44	58	44	146	1.0%
Former Yugoslavia	426	1,261	84	1,771	12.1%
Others	305	436	481	1,222	8.3%
Total	2,810	9,396	2,436	14,642	100.0%

TABLE 16: ITALY'S EXPORTS TO EUROPE

About 10 m tons of diesel leave the country each year, destined for Spain, accounting for more than half of the total export volume, former Yugoslavia, France, Greece, Belgium, Austria and Switzerland.

Imports

Imports of finished products declined as imports of semi-finished products increased. Italy's imports of finished products mostly concern chemical feedstock and LPG. The main countries of origin have been the USA (~21%), Libya (~20%) and the CIS countries with about 8% of total imports. The most important exporter of refined products in Europe is France (~7%). Looking at the defined geographic area, only Germany and Switzerland are listed, together coming up to a paltry 1%.

Similar to Germany, LIFO and LOFI values, given in TABLE 17 below, are quite high, though they have declined compared to 2006. This is not surprising; Italy has some excess production that is exported. At the same time, only insignificant amounts have to be imported to fill the gaps in the Italian output structure.

LIFO	
2007	**2006**
0.84	0.89
LOFI	
2007	**2006**
0.70	0.74

TABLE 17: ITALY, LIFO&LOFI VALUES

5.3.2. Transport

The distribution of crude oil and products follows the pattern with which we have already been confronted. Refineries are supplied via pipelines in case that they are not located on the coast, where they are directly supplied by crude oil tankers. Refined products are transported in bulk loads to storage deposits, ideally through a product pipeline, from where they are distributed by means of transport that carry smaller loads but have a denser operating network, i.e. transport by tank wagon or lorry. The Italian Oil Industry Association puts the percentage rate of road haulage at 65% for consumer supplies.

Not until 1998 was regulation of supply withdrawn or reformed, with public authorities aiming to reduce the vast number of sales points.

As mentioned before, crude oil imported to Europe is almost always shipped to Europe by tanker. Italy's position in the middle of the Mediterranean Sea, favours this kind of transport, as almost a third of worldwide shipping routes traverse the Mediterranean. In TABLE 18 the most important oil harbours are listed.

Crude arrivals by ports 2007[28]

Location	in tons
Augusta (Syracuse)	14 650 000
Cagliari	14 645 000
Falconara (Ancona)	3 525 000
Fiumicino (Rome)	3 645 000
Gela (Caltanissetta)	2 480 000
Genoa-Multedo*	15 020 000
Livorno	4 665 000
Milazzo (Messina)	7 590 000
Priolo Melilli (Syracuse)	8 345 000
Ravenna	140 000
Savona- Vado Ligure	7 460 000
Taranto	2 225 000
Trieste**	33 590 000
Venice - Porto Marghera	6 370 000
Total	124 350 000

*once provided crude for the CEL pipeline, which has been out of service since 1997
** provides oil for the TAL pipeline
TABLE 18: ITALY, CRUDE OIL ARRIVALS BY PORTS

[28] Table from Unione Petrolifera "Annual Report 2008" p. 110

Pipelines

Crude oil pipelines

Not surprisingly, crude oil pipeline systems in Italy are designed to supply refineries in the hinterland of coastal regions, the accommodative pipelines are owned by the same owners of the refineries they supply.

There are only two international crude oil pipelines: The TAL that starts in Trieste and crosses the Alps and the former CEL pipeline starting in Genoa. The TAL is operated by SIOT (Società Italiana per l'Oleodotto Transalpino) from the harbour in Trieste to the Austrian border. FIGURE 9 at the beginning of the chapter on Italy shows locations of pipelines and refineries.

PRAOIL is a pipeline operating company and wholly owned by ENI. With this knowledge, one could argue that ENI is also the leader pipeline transportation. Through PRAOIL, it supplies the Sarpom refinery of ExxonMobil/ERG with feedstock.

ARCOLA PETROLIFERA is a wholesaler, owned by the Moratti family, which also owns the SARAS SpA refinery on Sardinia. TABLE 19 gives the details[29]:

Pipelines for crude oil	Length in km	Owner
Genova-Ferrera (PV)	90	PRAOIL
Ferrera (PV) - G.S. Bernardo (1)	206	PRAOIL
Ferrera (PV) - Cassina de' Pecchi	68	PRAOIL
Ferrera (PV) - Cremona	113	PRAOIL
Trecate (NO) - Ferrera (PV)	43	ENI
Genova - Busalla (GE)	24	IPLOM
Quiliano (SV) - Trecate (NO)	145	SARPOM
La Spezia - Arcola (SP)	9	ARCOLA PETROLIFERA
P. Marghera (VE) - Mantova	123	IES
Trieste - Timau (UD) (2)	145	SIOT
Fiumicino (RM) - Pantano di Grano (RM)	14	TOTAL
Viggiano (PZ) - Taranto	137	ENI
Ragusa - Augusta (SR)	57	ENI
Pipelines for products		
Ferrera - Carrosio (AL) - Arquata (AL)	62	PRAOIL
Cassina de' Pecchi (MI) - Sant'Agata (MI)	3	PRAOIL
Sannazzaro (PV) - Rho (MI)	51	PRAOIL
Sannazzaro (PV) - Chivasso (TO) - Volpiano (TO)	93	PRAOIL

[29] Source: Unione Petrolifera

Sannazzaro (PV) - Fiorenzuola (PC)	94	PRAOIL
Genova - Lacchiarella (Ml) - Villasanta (Ml)	151	SIGEMI
Lacchiarella (Ml) - Tavazzano (Ml)	25	SIGEMI
Lacchiarella (Ml) - Cassina de' Pecchi (Ml)	10	SIGEMI
Trecate (NO) - Vado Ligure (SV)	158	SARPOM
Trecate (NO) - Chivasso (TO)	84	ESSO
Trecate (NO) - Arluno (Ml)	16	ESSO
Trecate (NO) - Turbigo (Ml)	13	ESSO
Trecate (NO) - Malpensa (VA)	33	SARPOM
Busalla (GE) - Genova	24	IPLOM
Arcola (SP) - La Spezia	9	ARCOLA PETROLIFERA
Genova - Arquata Scrivia (AL)	37	SIGEMI
Cremona - Piacenza	29	EDIPOWER
Cremona - Tavazzano (Ml)	54	TAMOIL
Tavazzano (Ml) - Trecate (NO)	62	TAMOIL
Cremona - Borgo S.Giovanni (MN)	100	TAMOIL
Borgo S.Giovanni (MN) - Dep. Sermide (MN)	11	ENDESA
Dep. Sermide (MN) - Dep. Ostiglia (MN)	1	ENDESA
Llvorno – Firenze	89	PRAOIL
Civitavecchia (RM) - Fiumicino (RM)	80	PRAOIL
Pantano (RM) - Fiumicino (RM)	16	RAFFINERIA DI ROMA
Ravenna - Porto Tolle (RO)	92	ENEL
Gaeta (LT) - Pomezia (RM)	112	PRAOIL
Trieste - Visco (UD)	62	SILONE

(1) Italian section of the connection Ferrera - Aigle of CEL; (2) Italian section of the TAL, from Trieste - Ingolstadt.

TABLE 19: ITALY, PIPELINES

Product pipelines

The above list provides an overview of the dense network of product pipelines, which expands across Italy. Although none of them can be considered as a north-south backbone of the country. The network primarily connects storage deposits with refineries located either in the interior of the country or on the coast.

SIGEMI is the abbreviation for "Sistema Integrato Genova", with ENI holding a stake. Sigemi can be considered as being a subsidiary, at least partly, ENI entrusts with transport issues. The company also holds storage deposits in North Italy.

EDIPOWER is an Italian power generation company. The in-house product pipeline supplies its power plant in Piacenza.

ENDESA is a Spanish power generation firm, whose Italian activities have been merged wit EON Italy, so it can be assumed that the pipeline has changed ownership and now belongs to the latter company.

ENEL is a major Italian power company owning the product pipeline form Ravenna to Porto Tolle.

SILONE – the pipeline from Trieste to Visco was once owned by TOTAL; current use or information about its owner could not be found.

Not only the main industrial areas have had to be supplied with products. Unione Petrolifera estimated the total fuel distribution network to have 22,450 sales points at the end of 2006. The average throughput amounted to 1,618 m³ of fuels, which is among the lowest average throughputs in Europe. In most countries, it exceeds the 2,000m³ mark, and surpassing even 3,000m^3 in Germany, France and Great Britain.

5.3.3. Storage Deposits

In TABLE 20 below all deposits, in refineries or next to thermal power plants, exceeding a capacity of 3,000m³ are cited[30].

Italy - Deposits for crude oil and products

	# of deposits	Capacity [1] in thousand m³ Crude	LGP	Petrol	Diesel	Fuel Oil	Lubricants	Other	**Total**
Piemonte	72	–	21.5	536.1	1,471.8	671.0	108.8	68.4	**2,877.6**
Val d'Aosta	2	–	0.1	0.3	2.5	0.4	0.1	0.5	**3.9**
Liguria	34	1,814.9	7.0	240.5	637.0	1,024.8	165.1	226.8	**4,116.1**
Lombardia	121	–	43.3	193.0	928.8	2,030.7	31.2	171.3	**3,398.3**
Trentino Alto Adige	16	–	2.2	1.7	10.3	0.1	0.2	0.8	**15.3**
Friuli Venezia Giulia	20	1,870.0	2.1	199.5	386.6	577.4	3.2	2.5	**3,041.3**
Veneto	52	91.6	19.4	138.2	919.4	1,371.3	7.0	119.5	**2,666.4**
Emilia Romagna	41	–	10.4	97.2	143.4	828.2	29.0	57.4	**1,165.6**
Toscana	51	–	65.2	48.3	273.0	512.7	56.1	40.3	**995.6**
Umbria	11	–	1.8	–	34.3	49.9	0.1	0.1	**86.2**
Marche	16	–	5.4	4.0	79.5	48.2	1.1	20.1	**158.3**
Lazio	47	–	6.1	590.4	1,155.1	351.4	29,6	460.0	**2,592.6**
Abruzzo	18	–	4.8	30.8	75.1	18.8	1.1	31.8	**162.4**
Molise	4	–	0.6	–	17.9	–	–	–	**18.5**
Campania	59	–	36.0	642.6	707.8	300.8	23.2	123.6	**1,834.0**
Puglia	44	–	30.4	21,8	41,6	625,8	5,5	0,5	**725,6**
Basilicata	6	–	0.6	–	0.1	63.1	0.2	–	**64**
Calabria	23	–	4.5	45.1	24.8	427.6	2.5	5.0	**509.5**
Sardegna	39	–	11.2	22.0	49.6	249.0	7.2	67.4	**406.4**
Sicilia [2]	28	–	7.8	60.0	112.1	845.2	3.6	14.8	**1.043.5**
TOTAL	**704**	**3,776.5**	**280,4**	**2,871.5**	**7,070.7**	**9,996.4**	**474.8**	**1,410.8**	**25,881.1**

[1] Capacity includes all the deposits appending to the deposits of the central thermic power plants of Enel, as well as the capacities held by refineries. Deposits with a capacity beneath 3,000m³ excluded. [2] Incomplete data

TABLE 20: ITALY, STORAGE DEPOSITS

[30] Source: Unione Petrolifera/Ministero delle Attività Produttive

There are more than 700 deposits exceeding 3,000m³ and a further 15,000 tank farms with lower storage capability. The logic for the choice of location for refineries also applies to storage deposits: They are either located along the sea shore, where they can get delivered by tanker or they are positioned in the hinterland, in proximity to refineries, large industrial complexes or power plants. Capacities are concentrated in Liguria, Lombardia, Friuli, Piemonte, Veneto and Lazio. Most Italian crude oil reserves are stored in Friuli and Liguria. Generally, a North-South divide can be observed, except for Sicily where significant refining capacities exist.

ENI describes itself as "leader in storage and transport of petroleum products in Italy"[31] in its annual report, but this is no surprise. ENI possesses the largest refining capacities, is the largest owner/operator in pipeline transport and therefore has to have the most comprehensive storage facilities.

5.3.4. Conclusions for Italy

At first sight, I found the scale of the oil industry striking, and that it even showed a slight increase in capacity in recent years. Imports of oil products amounted to 15 m tons in 2007. This value constitutes less than 20% of total domestic consumption – Italy can be considered as a relatively independent country, at least regarding supply with refined products. However it is – like almost every country in Europe – highly dependent on crude oil imports, as domestic production only reached 5.9 m tons compared to oil consumption of 83 m in 2007.

The favourable geographical position in the middle of the Mediterranean Sea in close proximity to much-frequented shipping routes and not far away from important North African oil-exporting countries such as Libya, the comparative advantage of Italy's oil refining sector is obvious. The centres are situated in Sicily; it is best supplied by crude oil tankers and in the northwest, where there is a high demand.

In the 1970, Italy had twice as much refining capacity and suffered from capacity utilization ratios below 60% throughout the Eighties, making it necessary to scale back operations. Today the industry claims to operate at almost full capacity. Reforms were initiated and political efforts to liberalize the sector began in earnest. Over the past few years, existing sites have undergone a series of modernisation drives, involving upgrading conversion capacities and desulphurisation units in order to meet European standards and demand. In keeping with the European trend, Italian demand is shifting to diesel fuel and light fuel oil, away from higher sulphuric fuels and petrol. According to the Italian Oil Industry Association, € 5.9 bn was invested in the modernisation of refineries to improve quality and lower emissions between 2001 and

[31] ENI "Fact Book 2007" p. 73

2005. Further efforts were also made to enhance the complexity and efficiency of the remaining units. The introduction of the ISAB refineries should reduce the extent to which crude oil is shipped into the Adriatic and Ligurian Sea, to lower the burden for the environment and traffic.

The leading firm in the industry is without a doubt ENI S.p.A., a highly vertically integrated company, with a domestic market share of 30% and a strong position in the areas of storing and transport. Italy has been rife with allegations about horizontal collusion in retailing motor fuels and several measures have been implemented to counter these. Licences for gas stations along motorways were reallocated, better comparativeness of fuel prices for drivers and licences for large supermarkets to sell fuel were issued. However, entry into the refining market is another story.

5.4. Hungary

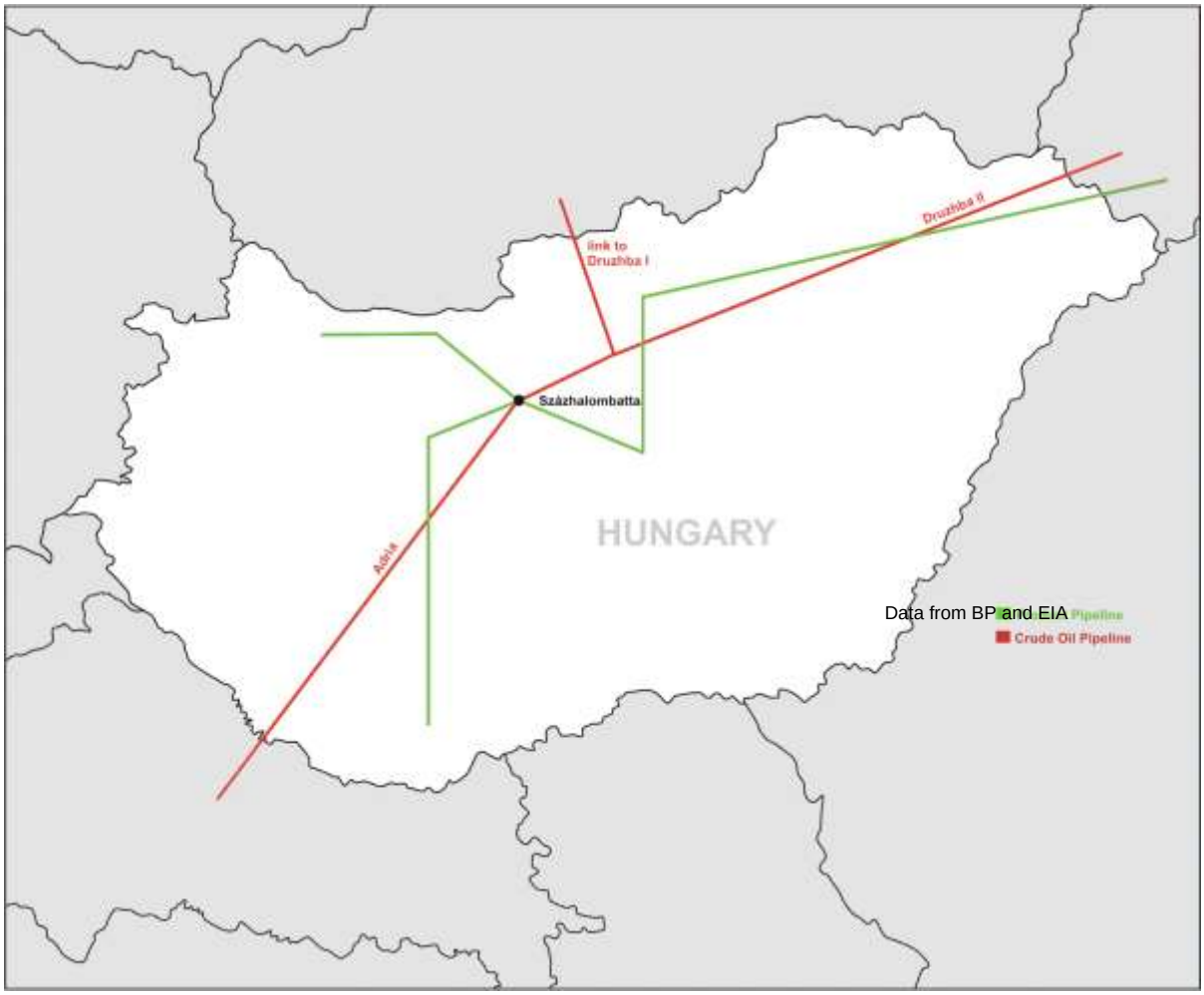


FIGURE 13: HUNGARY

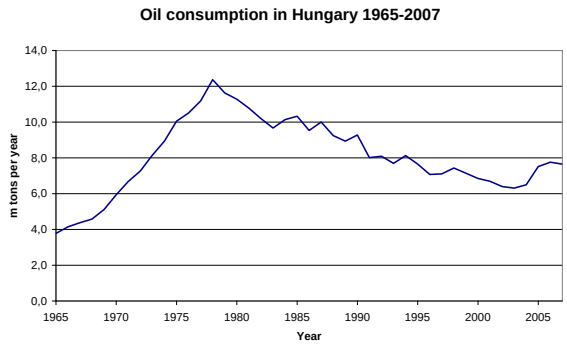


FIGURE 14: HUNGARIAN OIL CONSUMPTION

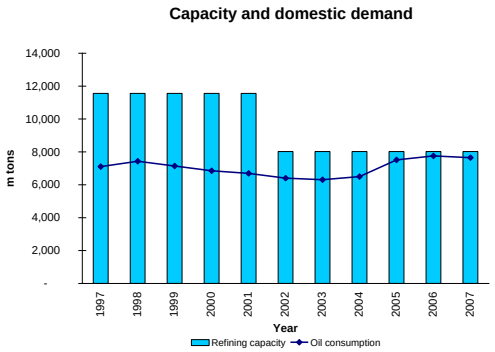


FIGURE 15: HUNGARIAN CONSUMPTION AND CAPACITY

As it can be seen in FIGURE 14, Hungarian oil consumption peaked at the end of the Sixties when car traffic levels soared and agriculture was being modernized. In FIGURE 15 the infrastructure of the Hungarian oil industry is depicted. Again product pipelines are depicted in green and crude oil pipelines in red respectively.

The amount of 7.6 m tons of mineral oil was consumed in 2007; the majority of oil, about 5 m tons was used by the transport sector. Refining capacity exceeded domestic consumption, as can be seen in the bar chart above. There is a considerable amount of capacity in the areas of refining and transportation (setup of pipelines), seeing as there was a huge wave of expansion in the late 1960s. When it became clear that existing capacity was underexploited and capacity utilization ratios were deteriorating, capacity was slashed to enhance efficiency. The development can be followed in FIGURE 15. Since the beginning of 2002, and the decommissioning of the Tisza and Zala refineries, there is only one crude oil processing site in Hungary located on the premises of the Duna Refinery in Százhalombatta. It is owned and operated by MOL.

In recent years, Hungary has been supplied with crude oil almost exclusively from Russia, as local resources are declining and annual production only covers 20% of demand.

5.4.1. Refining

Hungary had the ability to refine 8.1 m tons of crude oil in 2007 at its single refinery, TABLE 21 provides further details.

Company	Refining sites	Nameplate capacity in m tons	Share in Equity in %	Location	Distillation Capacity in m tons	Total	Market share in % in %
MOL	Duna Refinery	8.10	100.00%	Százhalombatta	8.10	8.10	100.00%
TOTAL						**8.10**	**100.00%**

Source: MOL "Annual Report 2007"

TABLE 21: HUNGARIAN REFINERIES

As can easily be inferred from the above table, MOL operates the only oil refinery in Hungary. Moreover, according to the IEA MOL "controls approximately 80% of the Hungarian wholesale oil products market".

MOL exports a substantial amount of products – in 2004 exports amounted to 2.9 m oil equivalents. Petrol and diesel are the most actively traded products with the main export destinations being Austria, Germany and Slovakia.

The lack of any recent data regarding foreign trade with respect to products and countries means that it is not possible to conduct a detailed analysis of import/export flows. However, I did some calculations to get estimates for the LIFO and LOFI values, which are given in TABLE 22. Taking 2007's production and consumption figures and assuming exports of products still amounting to 3 m tons results in a LIFO of 0.67 and a LOFI of 0.63. These estimates can be considered to be evidence that the relevant geographic market is bigger than Hungary.

LIFO	
	2007
	0.67
LOFI	
	2007
	0.63

TABLE 22: HUNGARY, LIFO&LOFI VALUES

5.4.2. Transport

Almost half the total amount of crude oil and its products is transported by pipeline; quantities forwarded by rail and by barge are declining. Road transport comes in second with a 31% share of the total volume shipped. Delivery by tank lorry is crucial to supply the relatively thin filling station network of around 1000 stations country-wide. MOL runs most of the stations (354 in 2005) followed by Shell and OMV with half the outlets.

Crude oil pipelines

The first crude oil pipeline in Hungary was a connection to the northern branch of Druzhba. The branch connection to Százhalombatta was established in 1965. To meet growing demand, Druzhba II was planned and finished in 1969. In the Seventies, when Hungary's demand for crude oil reached its peak, forecasts said that domestic demand would reach 20 m tons in 2000. Another pipeline project was planned, the Adria pipeline, with an annual capacity of 10 m tons of crude oil.

In fact, demand in 2000 accounted for 6.8 m tons, meaning that Hungary possesses significant surplus capacity in crude oil supplies by transport. The Adria pipeline is

used for transit purposes. It opens up the possibility to deliver INA's Sisak refinery in Croatia with Russian crude. MOL holds 47.2% equity in INA. Since 1992 crude oil is almost exclusively supplied via the Druzhba pipeline. This connection and the Adria pipeline are still in use (the latter turned out to enhance MOL's buyer power in bargaining with Russia).

Druzhba I&II

Druzhba II is the southern branch of the main oil pipeline from Russia towards Europe. It is capable of transporting 7.9 m tons per year and was completed in 1979. Whether the connecting pipeline from Druzhba I is still in operation remains unclear; sometimes it is uncharted on pipeline maps.

Adria

The Adria crude oil pipeline starts in Omisalj in Croatia. Construction was completed in 1978 and it has a capacity of 10 m tons per year.

Product pipelines

The importance of transport by product pipelines is on the rise, whereas transport by rail is losing importance. Trains are used to supply processing sites or buyers of bulk loads that have no pipeline connection as well as for export deliveries. MOL holds more than 1000-km of pipeline that connect 7 of its 8 whole sale depots countrywide. Hungary's domestic product pipeline network is the densest of all countries looked at up to now.

5.4.3. Storage Deposits

Százhalombatta and Fényeslitke (80,000m³ capacity near the Ukrainian border, fed by Druzhba II) are crude oil storage yards run by MOL's logistics division. 41 storage deposits are owned or leased by MOL. There are 8 remaining storage depots owned by MOL in Hungary. All, except for one, are connected to product pipelines.

Hungary holds emergency energy reserves amounting to 1.2 m tons. These reserves contain crude oil as well as products and should cover demand for 90 days of consumption. The Hungarian Hydrocarbon Stockpiling Association – MSZKSZ – controls five storage companies running tank farms. A third of strategic reserves are stored in facilities belonging to MOL that is supposed to hold about 75% of capacity. The remaining quarter is accounted for by independent providers that rent their capacity out to customers.

MOL is engaged in retailing mineral oil products in several countries in the mid-eastern region. MOL runs a network of deposits to supply its sales points, with most of these deposits being supplied by pipeline or barge – like MOL's deposit in Korneuburg, near Vienna, or the tank farms in Slovakia and the Czech Republic,

which can easily be supplied by product pipelines or by barge on the Danube. MOL's ownership of Slovakia's Slovnaft refinery is especially useful, because it provides access to the product pipeline network connecting both countries. Furthermore plans to link the pipeline networks of MOL in Hungary and Slovnaft are "under review", according to a publication of the company.

It is no surprise that the largest (and sole) producer of refined products is also dominant in storing and transport. For a potential entrant, this environment may seem daunting, as entrance would entail at least tough bargaining with the incumbent.

5.4.4. Conclusions for Hungary

It is worth mentioning that MOL inherited industrial premises that could be regarded being obsolete and inefficient in many cases. Nevertheless the company remains the largest player in Hungary and does business across national borders. Estimates forecast the country to experience only a marginal growth in demand, further supporting MOL's ambitions as capacity does not have to be fully exhausted to cover domestic demand.

Obviously, MOL holds a dominant position in Hungary – for refining, wholesaling and retailing. Not only does the company own the country's only oil refining site but it also runs a dense network of product pipelines and storage deposits. In addition to this, a second important refinery is owned by MOL: The Slovakian Slovnaft Refinery in Bratislava, including access to its product pipelines linking Slovakia and the Czech Republic. This asset is a decisive one to extend market power to the surrounding countries targeted by the MOL Group: Slovakia, Poland, the Czech Republic and Austria. The acquisition of the Croatian INA and the IES Refinery in Mantova, North Italy, gives MOL the opportunity to expand its commercial interests in Austria and even in Romania. This enlargement of capacity has the cumulative effect of strengthening the company's position in Hungary, as it creates free capacity at home.

Although international majors, as well as the Austrian OMV, are active in the Hungarian fuel retailing market, there are parts of the country where only MOL is able to deliver certain products. This is due to the large distance to refineries not run by the Hungarian market leader. In 2005 MOL changed its pricing policy and increased its retail prices by less than its wholesale prices in order to force competitors to reduce their margins or to lose market share in retailing. The European Commission prohibited MOL doing so to stop the company from further increasing its market share in wholesaling.[32]

[32] IEA, Energy Policies of IEA Countries, "Hungary 2006 Review", Paris, 2006, p. 115

MOL's course of action can be seen as an attempt to exert a price squeeze on its competitors. According to Motta, a vertically integrated firm engaging in a price squeeze is selling the input to the rival at a prohibitively high price. This procedure intends increase the rival firms cost of production. The entry of the British retail company Tesco into the Hungarian fuel retail market in 2004 underlines how controversial this issue is. Tesco's filling stations are not supplied by MOL's refineries and put substantial pressure on prices in fuel retailing. Consumers showed great willingness to travel to benefit from price differences. These significant chain-of-substitution effects might have had immediate detrimental effects on competition if the price squeeze had prevailed.

While market positions are clear within Hungary, it will be interesting to investigate the competitive environment on the market for refined products that is nevertheless not supposed to be a national one.

5.5. Slovakia

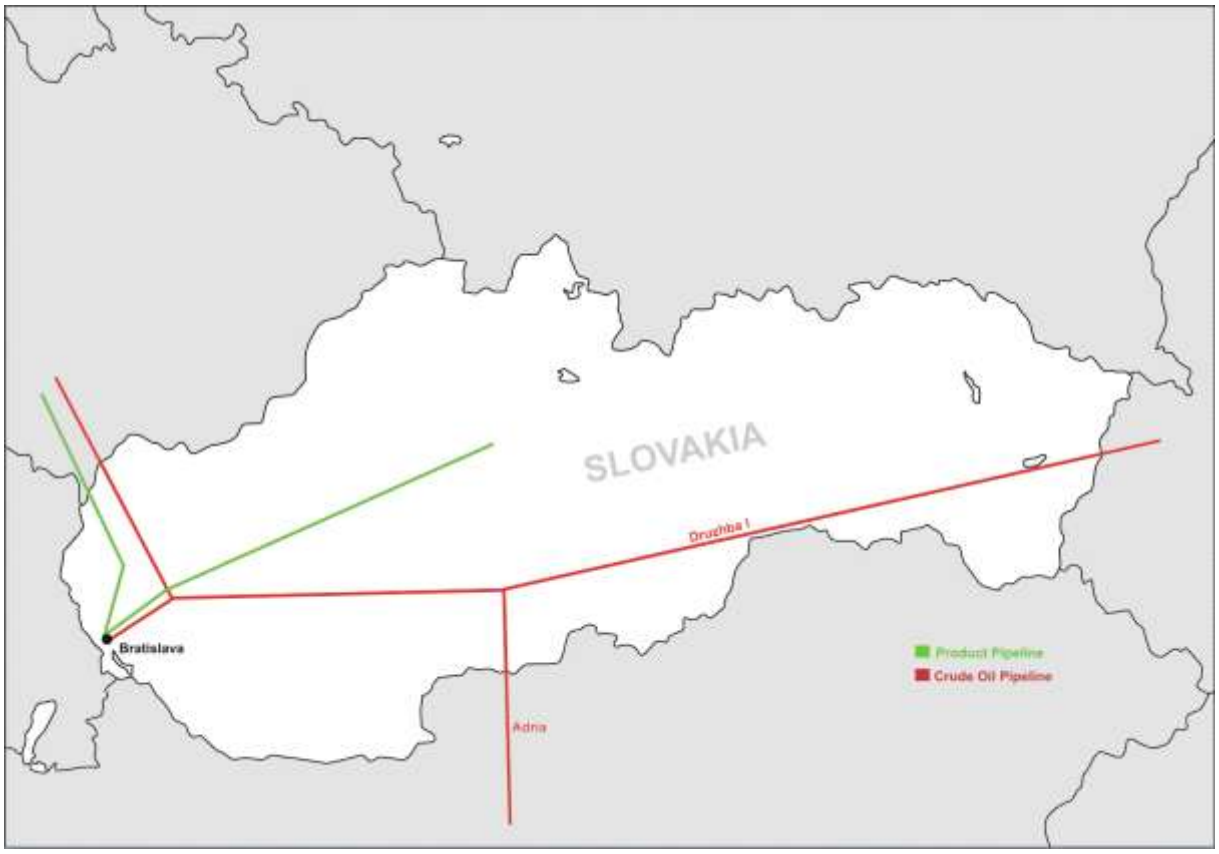


FIGURE 16: SLOVAK REPUBLIC

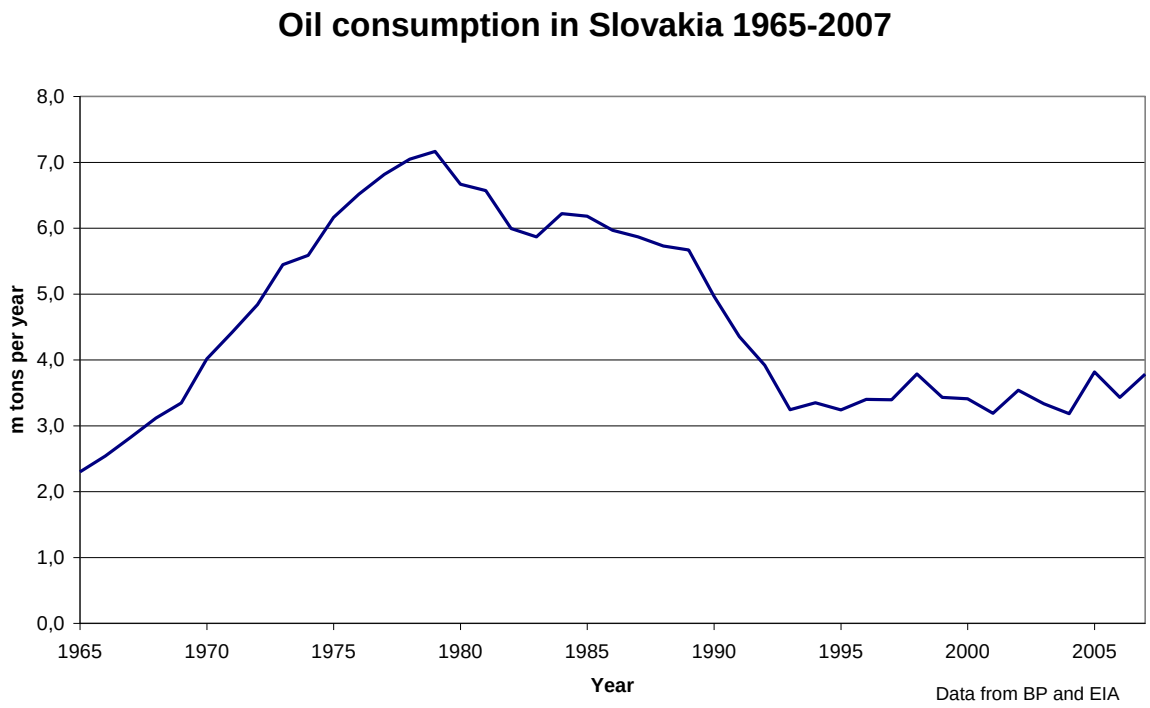


FIGURE 17: SLOVAKIA, OIL CONSUMPTION

Looking at the chart in FIGURE 17, it is easy to identify a familiar pattern in oil consumption over time, at least when comparing it to Hungary and the Czech Republic. Oil consumption reached its peak in the second half of the Seventies before starting a substantial decline. After the collapse of the Soviet Union, oil consumption stabilized and ascended somewhat. It is astonishing that oil consumption was cut in half in the years between 1975 and 1995. Consumption of mineral oil amounted to 3.8 m tons in 2007. Though there are some indigenous sources of crude oil in the west of Slovakia, 5.6 m tons are imported from Russia through the Druzhba pipeline. The supplying firm is Lukoil which stepped in after the demise of Yukos.

5.5.1. Refining

The sole mineral oil refining site in Bratislava had 5.8 tons of refining capacity in 2007. All refining capacity is concentrated in the Slovnaft refinery in Bratislava; details are shown in TABLE 23 below.

Company	Refining sites	Nameplate capacity in m tons	Share in Equity in %	Location	Distillation Capacity in m tons	Total	Market share in %
Slovnaft/MOL	Slovnaft Refinery	5.80	100.00%	Bratislava	5.80	5.80	100.00%
TOTAL						5.80	100.00%

Source: MOL "Annual Report 2007"

TABLE 23: SLOVAKIAN REFINERIES

Between 2000 and 2003, the Hungarian MOL gradually acquired Slovnaft, ending up with an equity share of 98.4%. Large investments have been made in order to modernise the premises of the refinery and enlarge its conversion capabilities.

Output structure is depicted in the diagram below; to the right the exact figures are listed. Regrettably, no figures could be found for products such as turbine fuel, light fuel oils or lubricants. According to SAPPO[33] Slovnaft has achieved the following output structure, explained in detail in FIGURE 18.

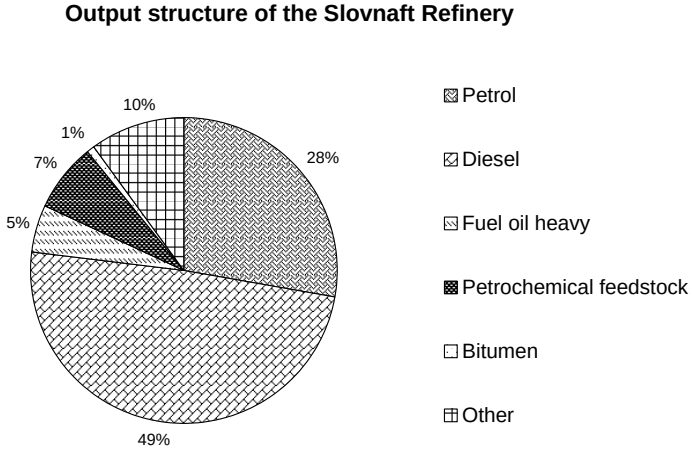


FIGURE 18: OUTPUT STRUCTURE OF THE SLOVNAFT REFINERY

Output	in tons
Petrol	1,617,000
Diesel	2,864,000
Fuel oil heavy	284,000
Petrochemical feedstock	427,000
Bitumen	36,000
Other	588,000
Total	5,816,000

TABLE 24: OUTPUT STRUCTURE OF THE SLOVNAFT REFINERY

87% of production refers to motor fuels and other light products, underlining that the Slovnaft refinery has reached a good position regarding conversion technology. Conversion is about a refinery's capability to convert crude oil to light products. Demand for the latter products is rising throughout Europe – this can be considered beneficial for Slovnaft's export market ambitions.

[33] The Slovak Association of Petroleum Industry and Trade

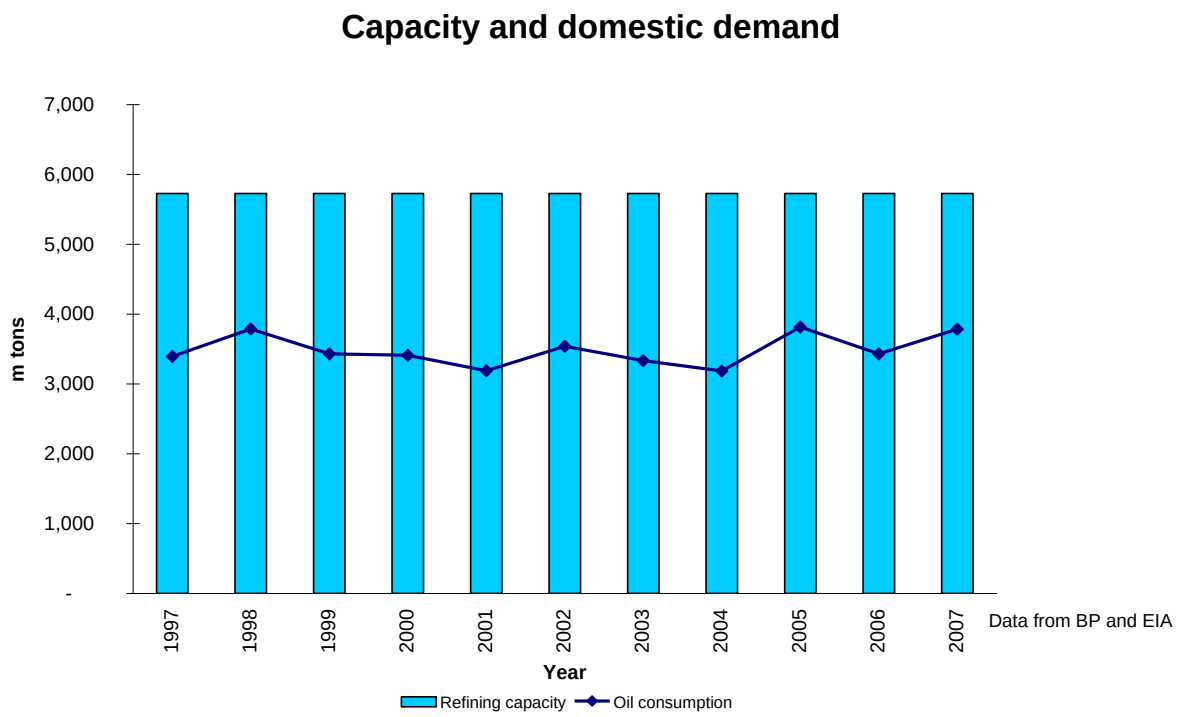


FIGURE 19: SLOVAKIAN CONSUMPTION AND CAPACITY

The availability of excess production is visible in FIGURE 19 above, revealing that Slovnaft is in the comfortable position of being able to fully cover domestic demand and export the remainder, at least as far as the bare figures are concerned.

The calculation of import shares compared to domestic production is not very detailed given that the Slovakian Oil Industry and Trade Association only provides figures for the most common products. The Slovnaft refinery certainly produces a range of other products, but even more common ones such as turbine fuel are not listed in TABLE 25[34]. Slovnaft's Annual Report says that 79,700 tons were produced in 2007 – the main part of demand for turbine fuel may have met with imports.

[34] Source: SAPPO "Annual Report 2007" only available at the association's homepage

Domestic production vs. Imports 2007					
	Domestic production		Imports		Total
	in t	in %	in t	in %	in t
Gasoline					
Petrol	1,617,000	87.6%	229,000	12.4%	1,846,000
Middle distillates					
Diesel	2,864,000	84.6%	520,000	15.4%	3,384,000
Fuel oil heavy	284,000	100.0%		0.0%	284,000
Other					
Petrochemical feedstock	427,000	100.0%		0.0%	427,000
Bitumen	36,000	100.0%		0.0%	36,000
Other	588,000	73.9%	208,000	26.1%	796,000
TOTAL 2007	**5,816,000**	**85.9%**	**957,000**	**14.1%**	**6,773,000**
TOTAL 2006	*5,254,000*	*84.8%*	*940,000*	*15.2%*	*6,194,000*

TABLE 25: SLOVAKIAN DOMESTIC PRODUCTION AND IMPORTS 2007

The Slovakian Oil Industry Association declares that "¾ of domestic products were exported from Slovakia", a figure that does not really correlate with the figures listed above. If 75% of domestic production were exported, domestic consumption would not be covered by the remainder and imports of ~ 1 m tons of products, even if consumption was overrated and amounted to less than 3 m tons per year.

In addition to this, SAPPO writes that "60% of domestic demand for products was covered by domestic production", so the total amount of imports should reach 2.3 m tons. When calculating with imports of 2.3 m tons, exporting 75% of production would be feasible. Regrettably, there exist no more detailed import figures than those given in TABLE 25 above.

Calculating the LIFO/LOFI values, however, suggest that imports of 2.3 m tons seem to match reality given that the country's oil sector seems to be quite open in both directions. These values can only be calculated with figures for exports, production and consumption, which is really advantageous with dubious import amounts.

LIFO		
	2007	**2006**
	0.38	0.39
LOFI		
	2007	**2006**
	0.25	0.25

TABLE 26: SLOVAKIA, LIFO&LOFI VALUES

Without setting clear thresholds, both LIFO and LOFI given in TABLE 26 do suggest that the market for refined products is definitely larger than Slovakia. The LIFO value of 0.38 for 2007 fits the assumption of 40% imports which was discussed a few lines above. In 2005, IEA wrote that "The Slovakian oil refining industry exports 54% of its

refinery output (80% in value)"[35]. These figures are not as up to date as the figures of SAPPO are, however they warrant a recalculation of the LOFI values. With LIFO value coming up to 0.77 and the LOFI to 0.50, the changes are not negligible though the message remains the same. A country that exports half of its domestic production can not really be considered a market on its own. Either way, key target countries of Slovakian exports were the Czech Republic, Austria and Poland. These countries were primarily receiving motor fuels, thereof 1.2 m tons of petrol and 2 m tons diesel. There were additional exports of petrochemical feedstock to France, Italy and Germany.

Imports to the Slovak Republic originate from Austria, the Czech Republic and from Polish and Hungarian refineries. These imported products are largely motor fuels. Slovakia had to import 100% of its demand for LPG, and for the majority of its demand for fuel oil and lubricants (~90%). In addition to this, about a third of required amounts of diesel, petrol and bitumen had to be brought into the country.

5.5.2. Transport

About 730 service stations were in operation throughout Slovakia in 2007, of which 209 were run by Slovnaft, 92 by OMV, 66 by Shell, 63 by Jurki, 39 by Agip and some by Lukoil. As already outlined, filling stations have to be delivered by tank truck because the road system offers the densest transport system.

The country is well-connected to neighbouring countries via the Adria pipeline with Hungary or with the Czech Republic with the Druzhba crude oil pipeline. Transpetrol, a. s., has been a joint venture of the Slovak government (51%) and Yukos Finance (49%), which operates from Amsterdam. The company runs the Slovak sections of the Druzhba and Adria pipelines. Slovnaft is the only customer of Transpetrol in Slovakia, though Česká Rafinérská and Paramo a.s. also import crude oil via the two pipelines. In March 2009 the Slovakian government bought back Yukos' share in equity and wholly owns the company at this point of time. This might be the essential step towards the construction of the Bratislava-Wien pipeline (BSP), the project has been delayed many times in the past due to the stake of the Russian trading company. Transpetrol is also engaged in storing oil and oil products.

With regards to product pipelines, Slovakia has access to a product pipeline network with the Czech Republic. Furthermore, a product pipeline runs from the refinery in Bratislava to Stožok, located in the middle of the country. With its location near the Danube, the Slovakian Slovnaft Refinery can be said to be in a favourable position to export its products on a large scale.

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[35] IEA Slovak Republic "Energy Policy Review 2005", p. 121

5.5.3. Storage Deposits

According to the IEA, Slovnaft operates storage facilities with a capacity of 310,000 tons and 430,000 tons, respectively. Transpetrol, Slovnaft and ASMR (Administration of the State Material Reserves) hold Slovakia's emergency reserves of crude oil and oil products.

SAPPO lists 11 large storage deposits: three of them are linked to the Czech Republic by product pipeline, the others can be supplied by rail. These 11 deposits are supposedly in private hands and account for 35,000-37,000 m³. Slovnaft has an additional 40,000 m³ in tank farms; they are the distribution centres for the supply of the company's sales points.

5.5.4. Conclusions for Slovakia

Slovnaft's position on the refining market is obvious: The company runs the sole refining unit in the Slovak Republic. With regards to wholesale, the IEA stated in 2005 that Slovnaft dominates the Slovak wholesale market, holding a market share of 70-72% in the wholesale of motor fuels. This seems plausible as imports equate to approximately 25%-30% of domestic demand.

Imports may principally be obtained on behalf of local and global majors active in the Slovak fuel retail market. There are no logistical obstacles associated with imports as the country is highly integrated, open to neighbouring markets. Even though, restrictions are in place. Majors like Shell and Agip might not hold sufficient capacity in direct vicinity to enlarge their market shares. Only OMV's Schwechat Refinery produces within reasonable distance to challenge Slovnaft. After the takeover of Slovnaft by MOL in 2001 the Slovak Anti-Monopoly Office imposed restrictions on Slovnaft with effect from 2005, limiting its maximum number of service stations throughout the country in order to retain competition.

In conclusion, Slovnaft and its owner MOL are in a comfortable position in Slovakia. The refining site in Bratislava is conveniently located; it is fed by two crude oil pipelines that offer additional capacity and is connected to a product pipeline network running through Slovakia and the Czech Republic. Furthermore, the location on the Danube allows products to be efficiently transported by barge to Austria and Hungary or even Serbia. Somehow the overall picture resembles the one drawn for Hungary: A sole refinery, efficient and technically up-to-date, owned by a firm that is dominant on the domestic market. Furthermore, refining capacity exceeds domestic consumption and forecasts say this is not really to change. Spare capacity enables the large-scale export of oil, facilitated by the favourable location of the refining site.

5.6. Czech Republic

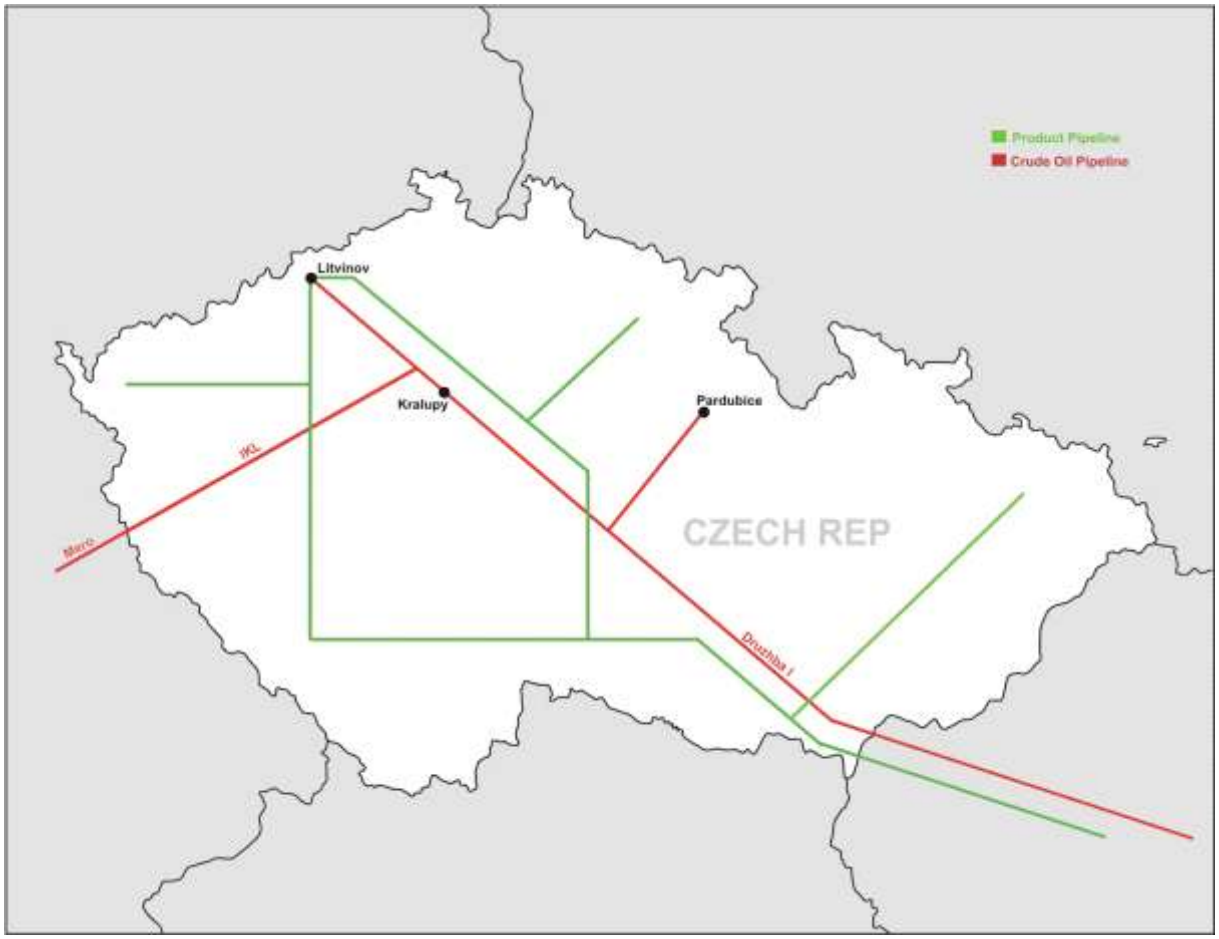

FIGURE 20: CZECH REPUBLIC

Crude oil supply occurs through the Druzhba pipeline of Transneft and via MERO pipeline, a branch of the Trans Alpine Pipeline that reaches the country via Germany. The refineries are fed by MERO and Druzhba (Litvínov), with only the refineries in Kralupy receiving its feedstock through both pipelines. Kralupy and Litvínov feed their produce into a countrywide network of product pipelines.

The Paramo refinery depends on Russian and domestic supplies. Crude oil imports to the Czech Republic amounted to 7.2 m in 2007, according to the Czech Oil Industry Association, 64.6% of which arrived through Druzhba while the rest was delivered through MERO. 227,000 tons of crude oil were produced at home.

The origins of crude were the following, depicted in FIGURE 21

Crude oil (thous. tonnes)	
Russia	4,498
Azerbaijan	2,072
Algeria	309
Kazakhstan	258
Libya	53
	7,188

TABLE 27: CZECH REPUBLIC, CRUDE OIL ORIGINS

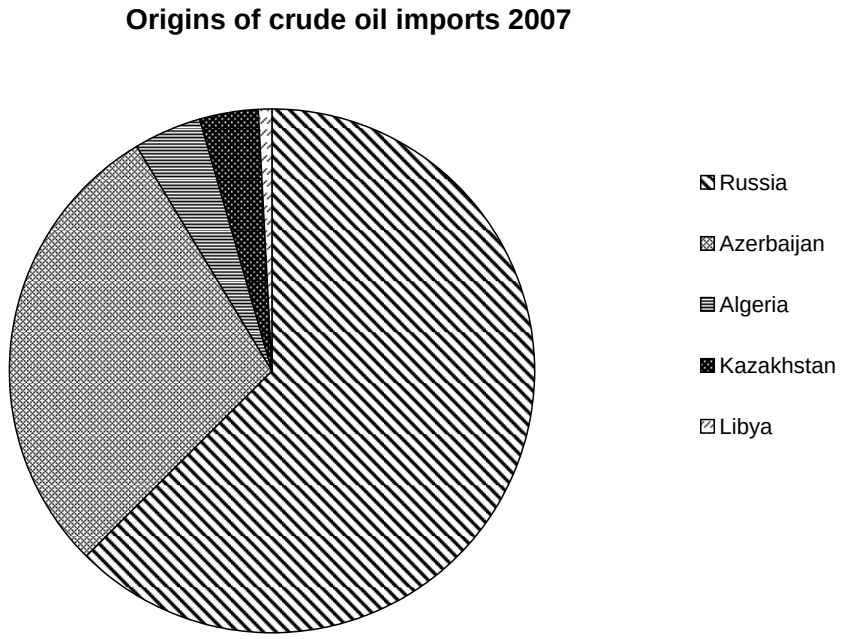

FIGURE 21: CZECH REPUBLIC, CRUDE OIL ORIGINS

9.9 m tons of mineral oil were consumed in 2007[36], so domestic refining could cover almost all of the demand. The evolution of consumption over time can be seen in FIGURE 22 below. After peaking in the Seventies, consumption declined steadily until the collapse of the Soviet Union, at which time consumption began to pick up again, reaching about 10 m tons per year.

[36] BP "Statistical Review 2008" Referring to inland demand plus international aviation and marine bunkers and refinery fuel and loss. Consumption of fuel ethanol and biodiesel is also included.

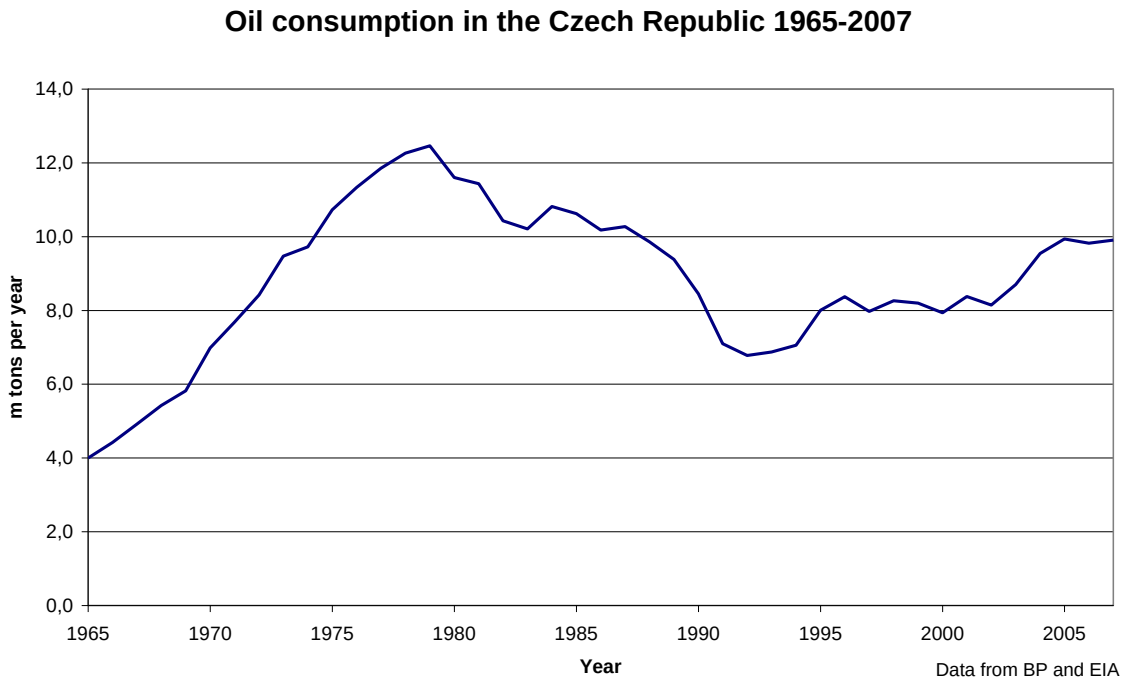

FIGURE 22: CZECH REPUBLIC, OIL CONSUMPTION

3,242 thousand tons of petroleum products were imported in 2007 (66.2% of which were motor fuels), while exports reached 1,108 thousand tons, about half of which were petrol or diesel.

5.6.1. Refining

The Czech Republic had a refining capacity of 9.3 m tons[37] in 2007, 3 refining sites are located in the Czech Republic: 2 refineries in Litvínov and Kralupy, run by Ceská Rafinérská, and one owned by the company Paramo situated in Pardubice. Kralupy is a city in the province of Central Bohemian; Litvínov is located in Ústí nad Labem close to Germany. TABLE 28 provides the details.

Company	Refining sites	Nameplate capacity in m tons	Share in Equity in %	Location	Distillation Capacity in m tons	Total	Market share in %
Česká Rafinérská	Litvínov	5.90	100.00%	Litvínov	5.90		
	Kralupy	2.70	100.00%	Kralupy	2.70	8.60	92.47%
Paramo	Pardubice	0.70	100.00%	Pardubice	0.70	0.70	7.53%
TOTAL						9.30	100.00%

TABLE 28: CZECH REFINERIES

[37] According to the EIA „World Crude Oil Distillation Capacity, January 1, 1970 - January 1, 2008 ”

The list of Czech refiners is short but things are not that simple: Ownership structure is outlined in FIGURE 23 below. In fact, the three refineries are controlled by Unipetrol, which in turn is controlled by the Polish PKN Orlen holding.

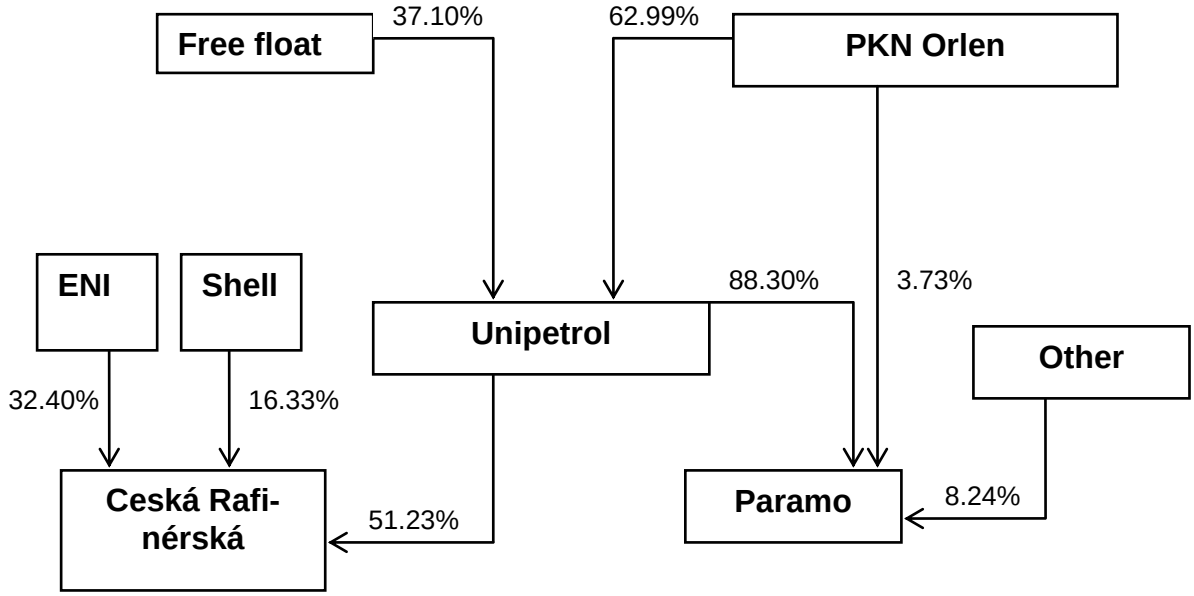

FIGURE 23: CZECH REPUBLIC, OWNERSHIP STRUCTURE OF THE REFINING INDUSTRY

Czech refining capacity is almost entirely controlled by one firm. In order to assess if the Unipetrol group can exercise its market power, evidence for the Czech Republic being the relevant geographic market has to be provided. Information on the share of domestic production and foreign trade provided by TABLE 29 can help.

Domestic production vs. Imports 2007

	Domestic production		Imports		Total	Exports	Domestic deliveries
	in t	in %	in t	in %	in t	in t	in t
Gasoline							
Petrol	1,555,000	69.3%	688,000	30.7%	2,243,000	194,000	2,092,000
Middle distillates							
Turbine fuel	145,000	36.8%	249,000	63.2%	394,000	2,000	373,000
Diesel	2,918,000	65.4%	1,543,000	34.6%	4,461,000	299,000	4,105,000
Fuel oils	417,000	77.9%	118,000	22.1%	535,000	145,000	374,000
Other							
	2,735,000	82.0%	599,000	18.0%	3,334,000	359,000	2,684,000
TOTAL 2007	**7,770,000**	**70.8%**	**3,197,000**	**29.2%**	**10,967,000**	**999,000**	**9,628,000**
TOTAL 2006	*8,181,000*	*74.1%*	*2,865,000*	*25.9%*	*11,046,000*	*1,134,000*	*9,679,000*

Source: Czech Association of Petroleum Industry and Trade

TABLE 29: CZECH DOMESTIC PRODUCTION AND IMPORTS 2007

30% of domestic consumption was delivered from abroad; a considerable dependence on imports can only be ascertained concerning turbine fuels, more than half of which had to be imported. Exports are declining in step with domestic production, in part due to extensive maintenance and modernization operations.

Output of the Czech refineries

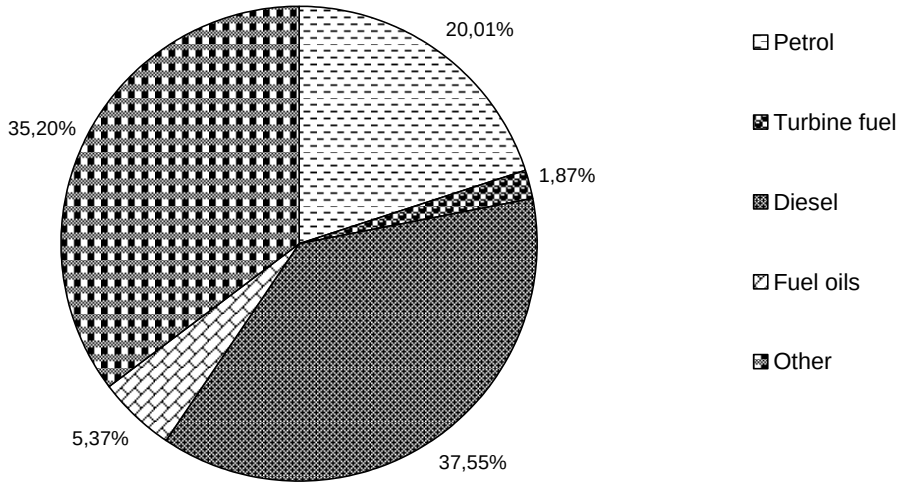

FIGURE 24: CZECH REFINERIES' OUTPUT STRUCTURE

FIGURE 24 above illustrates the output structure of the Czech refineries. The main products are diesel (38%) and petrol (20%).

The most important supplier countries in 2007 were Slovakia, Germany and Austria. Imports from Slovakia accounted for half of total imports and comprised petrol, diesel and fuel oil. Germany supplied naphtha, turbine fuel and diesel and 35% of imported products come from Germany. Austria's share was 5%, delivering diesel, petrol and bitumen. Its share is expected to quadruple by 2009. The remaining 10% of imports came from Poland, Belarus, Russia and Kazakhstan. Imports of oil products showed an upward trend, especially the demand for diesel, jet fuel, lubricating oils and bio-components.

When it comes to exports, the main export target countries are mentioned above. Poland and Austria each account for a quarter of Czech oil product exports, followed by Slovakia and Germany both accounting for a bit less than a quarter. The products exported are fuel oil (for Germany), diesel fuel and petrol. Applying the Elzinga-Hoggarty test for geographic market definition, the LIFO and LOFI values, given in

TABLE 30, are quite high. The LOFI value in particular comes close to the arbitrarily chosen threshold of 0.9. The EC talks about having found the geographic market, but this conclusion has to be handled with care.

LIFO		
	2007	**2006**
	0.70	0.73
LOFI		
	2007	**2006**
	0.87	0.86

TABLE 30: CZECH REPUBLIC, LIFO&LOFI VALUES

5.6.2. Transport

2500 service stations sell two or more types of motor fuels and have to be supplied with the latter; this is done via a comfortable network of product pipelines and distribution facilities throughout the country. Distribution facilities cover equipment to load tank trucks and tank wagons with produce from the pipelines. Those facilities are held by Čepro, a publicly owned firm.

Crude oil pipelines

Druzhba

The southern branch of Druzhba has the capacity to transport 10 m tons per year. Untill the IKL pipeline was completed in the Nineties, Druzhba was the only supplying pipeline with almost 9 m tons of throughput per year.

IKL/MERO

IKL is the abbreviation for “Ingolstadt-Kralupy-Litvínov Pipeline”, although it does not run through the mentioned cities but ends in a deposit in Nelahozeves near Prague. The pipeline is operated by the MERO Pipeline GmbH, a state-driven company. It also runs the Druzhba on Czech territory. IKL’s nameplate capacity amounts to 10 m tons per year but capacity did not get exhausted until very recently.

Product pipelines

Products are delivered through a network of product pipelines with adjacent deposits or facilities to reload to tank wagons or lorries. There is also a product pipeline providing the Czech Republic from Bratislava’s Slovnaft refinery. The product pipelines are run by Čepro.

5.6.3. Storage Deposits

The central reserve for crude oil is situated north of Prague in Nelahozeves, where both crude oil pipelines end. The reserves are owned and run by ASMR (Administration of State Material Reserves), while the already mentioned state-owned company Čepro owns and runs the facilities.

5.6.4. Conclusions for Czech Republic

The refining sector of the Czech Republic tells a story of privatisation and modernization that end with a sole supplier of refined products. The Polish PKN Orlen controls both firms running processing sites on Czech territory. Paramo is a formerly state owned company and only being privatised in 2000 through publicly advertised bidding. The bid was awarded to Unipetrol, because the other bidders could not meet the requirements. 49% of Unipetrol's largest subsidiary, Ceská Rafinérská, had been acquired by Shell, ConocoPhillips and Agip/ENI. The government finally began selling its stakes in Unipetrol on the stock exchange bit by bit from 1997 on. Measures were seized to rapidly modernise the premises in order to come up to European fuel specifications, while programmes for alternative and sulphur-free automotive fuels are on the way.

The entire refining capacity in the Czech Republic is controlled by the majority owner, the Polish PKN Orlen. This may raise concerns but even with considerable high LIFO and LOFI values, the country is dependent on certain supplies from abroad. The rapidly growing demand for diesel cannot be met by domestic production alone, even though storage capacity should recover from maintenance shutdowns.

BP, Esso, TOTAL, OMV and Slovnaft have invested in retail networks of service stations throughout the whole country. Each of these firms is able to import bulk amounts of oil products and step in if the national retailer ceases to supply. The MOL-owned Slovnaft in the neighbouring country runs a product pipeline network connecting Slovakia and the Czech Republic. In addition to this, Slovnaft has significant spare capacity to engage in export business. These facts temper somehow the concerns about concentration in the country's industry.

6. Assessment of the Industry

When collecting data and analyzing the industry in the 6 countries under review, several potential scenarios of behaviour detrimental to competition arise. There can be firms in a dominant position abusing their market power, there can be collusion between competitors or certain circumstances could at least favour horizontal collusion.

Companies operating in the refining market are usually highly vertically integrated: That means they have subsidiaries that search for, drill and pump crude oil in the name of the company. Other company divisions may engage in oil refining, distribution and storage of feedstock and products until the products get sold in wholesale or retail markets, through filling stations acting under the same brand. This high degree of vertical integration may cause problems like vertical foreclosure, exclusive contracting, price squeezing or the threat of price wars when new firms enter also existing markets. Furthermore, the probability of market entry and the issue of "essential facilities" have to be reviewed.

Final definition of the relevant geographic market

Each of the countries that has been analysed separately so far does not necessarily represent relevant geographic markets. It is necessary to decide which areas do form a common market for refined products and which should be disregarded. A simple justification for the fact that markets for refined products should be broader than national markets is that there are countries in Europe without relevant domestic refining capacity. Relevant in this case means that a substantial part of domestic demand can be met by domestic production. Countries like Slovenia (which has been left out for this reason), Latvia or Estonia import all products demanded from refining sites abroad.

The national markets of Austria, the Czech Republic, Slovakia and Hungary are all considered part of the refining market in Central and Eastern Europe, the relevant geographic market. Austria is dependent on imports of products on a large scale and the Austrian major OMV is engaged in refining and marketing in all of the other 5 countries. The Czech Republic has strong ties with Slovakia, with its exports making up a third of the industry's production. The Hungarian MOL runs refineries in Hungary, Slovakia and Italy and retailing holds market shares in the Czech Republic and Slovakia. Moreover MOL is striving to increase its share of the Austrian retail market. Italy and Germany with their large oil refining industry constitute a competitive constraint on competitors in the aforementioned countries. The highly vertically integrated oil companies Agip/ENI, BP, ExxonMobil and Royal Dutch Shell run refineries in the two countries. Agip/ENI and ExxonMobil hold equity in refining capacity in both countries, while BP and Shell only do so in Germany. Each of these companies op-

erates a network of filling stations throughout the market and their refining sites are supposed to supply its subsidiary companies in the four smaller countries.

TABLE 31 below comes up with the Lifo and Lofi values of the countries concerned. No country passes the test that is achieving values of at least 0.9 in both tests, in the little-in-from-outside test and the little-out-from-inside test. It is easy to spot that Slovakia is the most open economy, when it comes to the oil industry.

Austria			**Hungary**		
	2007	2006		2007	
LIFO	0.47	0.49	LIFO	0.67	
LOFI	0.73	0.79	LOFI	0.63	
Czech Republic			**Italy**		
	2007	2006		2007	2006
LIFO	0.70	0.73	LIFO	0.84	0.89
LOFI	0.87	0.86	LOFI	0.70	0.74
Germany			**Slovakia**		
	2007	2006		2007	2006
LIFO	0.85	0.80	LIFO	0.38	0.39
LOFI	0.77	0.78	LOFI	0.25	0.25

TABLE 31: LIFO AND LOFI VALUES OF THE ANALYSED COUNTRIES

Germany and Italy cannot be considered as entirely belonging to the geographic market: Exports clearly have to be forwarded to the country of destination and transport is costly, even more so if certain means of transport are unavailable – product pipelines or waterways both show decreasing cost with rising distances. Hence transport by railway, or even more expensively by tank truck is necessary, and the incentive to keep transit short to keep down costs is dominant.

Territories along the Austrian/Czech border can of course be seen as integral part of the market, whereas refining spots in northern Germany or southern Italy are of no relevance. Oil products from Sicily would have to be brought to harbours in the north of Italy to be reloaded to tank wagons or trucks. Handling bulk loads is expensive as is changing means of transport. For this reason, I regard only the refining sites in the north of Italy as being part of the market in question. I take a similar stance with Germany: The region Gelsenkirchen/Cologne in the west remains part of the market as these refineries are located on the Rhine and transportation by barge can be performed on a large scale. All sites further to the north are excluded whereas the refineries in Spergau, eastern Germany can deliver their produce to the general vicinity of the German/Czech border via MIPRO product pipeline. FIGURE 25 below gives the outline of the relevant geographic market.

FIGURE 25: THE RELEVANT GEOGRAPHIC MARKET

I would like to conclude this section by detailing the following companies which constitute the relevant market and whose definition is based on information on trade flows and the feasibility of transport of bulk loads and the “threat” of exports into the neighbouring countries.

Table 32 below lists the companies wholly or partly owning the stakes in refineries. Details on crude oil refining capacity and the owning firms’ absolute and relative shares in total capacity, amounting to 136 m tons per year, are given. Equity share is reflected in the share in distillation capacity a refining site provides. The table comes up with 18 different refining sites owned by 14 different companies. The refining sites are arranged with respect to the owning company.

Holding equity in shares of a refining site can be regarded as a share in capacity of the refinery. All of the mentioned firm are operating in retail or wholesale of refined products. Holding equity does imply collaborate in the management of a site, thus knowledge in running a refinery is crucial.

Company	Refining sites	Nameplate capacity in m tons	Share in Equity in %	Location	Distillation Capacity in m tons	Total	Market share in %
OMV	Schwechat	10.00	100.00%	Schwechat	10.00		
	Bayernoil	12.00	45.00%	Ingolstadt	5.40		
	Burghausen	3.40	100.00%	Burghausen	3.40	18.80	13.75%
PKN Orlen							
Česká Rafinérská	Litvínov	5.40	100.00%	Litvínov	5.90		
	Kralupy	3.30	100.00%	Kralupy	2.70		
PARAMO	Pardubice	0.70	100.00%	Pardubice	0.70	9.30	6.80%
Shell	MIRO	14.90	32.25%	Karlsruhe	4.81		
	Rheinland Refinery	17.00	100.00%	Cologne	17.00	21.81	15.95%
BP	Bayernoil	10.00	22.50%	Ingolstadt	2.25		
	MIRO	14.90	12.00%	Karlsruhe	1.79		
	Ruhröl Refinery	12.90	50.00%	Gelsenkirchen	6.45	10.49	7.67%
ConocoPhillips	MIRO	14.90	18.75%	Karlsruhe	2.79	2.79	2.04%
TOTAL	Mitteldeutschland Refinery	12.00	100.00%	Spergau	12.00	12.00	8.78%
PDVSA	Bayernoil	12.00	12.50%	Ingolstadt	1.50		
	Ruhröl Refinery	12.90	50.00%	Gelsenkirchen	6.45	7.95	5.82%
Petroplus	Ingolstadt Refinery	5.00	100.00%	Ingolstadt	5.00	5.00	3.66%
MOL	Duna Refinery	8.10	100.00%	Százhalombatta	8.10		
Slovnaft/MOL	Slovnaft Refinery	5.80	100.00%	Bratislava	5.80		
	Mantova	2.60	100.00%	Mantova	2.60	16.50	12.07%
Agip/ENI	Sannazzaro	8.50	100.00%	Sannazzaro	8.50		
	Venice	4.20	100.00%	Venice	4.20		
	Bayernoil	12.00	20.00%	Ingolstadt	2.40	15.10	11.05%
Esso/ExxonMobil	Sarpom Refinery	8.75	75.40%	Trecate	6.60		
	MIRO	14.90	25.00%	Karlsruhe	3.73	10.32	7.55%
Tamoil	Cremona	4.50	100.00%	Cremona	4.50	4.50	3.29%
ERG Petroli	Sarpom Refinery	8.75	24.60%	Trecate	2.15	2.15	1.57%
TOTAL					136.71	136.71	100.00%

TABLE 32: MARKET SHARES OF THE WHOLE MARKET

Shell is the market leader with 16%, followed by OMV with 14%, MOL 12% and Agip/ENI 11%. Now that the relevant geographic market is finally defined, concentration measures can be applied and further analysis performed.

6.1. Assessment of market power

> *"Market power is defined as the ability of a firm to raise prices above its marginal cost"*[38]

The concise definition above is true only when several restrictions are taken into consideration. Firms without any market power can only be found in the abstract world of the Bertrand model with symmetric firms and homogenous goods – in a case of perfect competition. In the real world, every company is supposed to have market power to some extent; if not it is sincerely striving to obtain it.

A good measure for market power is the Lerner index, defined as the firm's mark-up, given by the ratio of the difference between price and marginal cost divided by the price of good i, p_i minus the marginal cost of good I, c_i

$$L_i = \frac{(p_i - C_i')}{p_i}$$

When trying to apply the Lerner index one encounters two main difficulties: Data for marginal costs are rarely available and hard to estimate. Moreover, the productive inefficiencies of a monopolist lead to higher costs and the case could arise that the Lerner index might find that even a monopolist is not dominant due to its costs exceeding the competitive level.

The traditional approach to assess market power includes several other variables which act as indicators: Shares of leading firms in a market, the relative position of competitors, potential entrants and the countervailing power of buyers.

6.1.1. Market shares

Analysing market share is a key point when analysing market power in an industry. A firm's high market share is does not suffice as evidence of its market dominance. If entry into the industry is easy or there are only a few buyers that exercise strong buyer power, a firm with a high market share would not be in a position to raise prices above the competitive level.

Regarding measures of market power always involves the question for certain thresholds. The most precise statement is given in the "Assessment of Market Power" Guidelines by the UK Office of Fair Trading:

[38] Motta (2007), p. 115

..“below 40% it is unlikely that a firm is considered dominant; above 50% dominance can be presumed”[39]

The EC does not set such explicit thresholds for market shares, but it is following the same practice. In cases where market share falls between 40%-50%, other evidence is used to support a decision – information on buyers’ power and excess capacities for instance. A firm with a market share below 25% can be presumed not to be in a dominant position. EC merger guidelines do suggest that concentration is presumed not to impede competition if the combined market share of the two merging firms does not exceed 25%.

It can easily be calculated that the market shares in the table above do not raise serious concerns about competition at this time. The largest company, Shell holds about 16% and there are a few other firms holding a somewhat smaller share. A merger of two of the bigger companies though could attract the attention of the European Commission: OMV and MOL for instance would come up to slightly more than 25%. In 2008, when such a takeover was on the cards, an investigation of the competitive environment was initiated.

In addition to the pure market shares that provide a rather snap-shot picture, there should also be recourse to other information. Theory suggests drawing on reserves of inputs (in this case of crude oil) to assess how consistent the positions in the market are. However, those reserves are as hard to put into concrete figures as licenses for drilling spots and estimates for the oil deposits are.

In the refining industry, the model of a highly vertically integrated company prevails. Many firms sell their own fuels under the same brand under which it had been refined and its raw material, crude mineral oil, had been produced. Major companies lacking their own supply in an area but running a retail network tend to hold stakes in local refineries or are supplied on the basis of payroll processing contracts. If prices are set too high, the threat of import of products, though expensive, has an effect on wholesalers meaning that a lack of buyers’ power is not a major issue.

[39] Motta (2007), p. 118

6.1.2. The Herfindahl-Hirschman index HHI[40]

This index is one of the most commonly used concentration measures; it often gets used in the assessment of mergers by competition authorities. The HHI is a simple summary statistic of the level of concentration in an industry. It takes account of the whole industry and is defined as the sum of the squared market shares of all firms in a defined market.

$$HHI = \sum_{i=1}^{N} S_i^2$$

N is the number of firms of an industry, S_i is the market share of firm i. The index takes values from zero – an infinitely large number of firms holding zero market share – to 10,000 with only one firm holding a 100% market share.

Again other factors have to be kept in mind when interpreting the results of the statistic. A firm could have achieved a high market share thanks to an advantage in technology and/or efficiency, market structure has to be taken as partly endogenously determined, and therefore the number of firms is not a sufficient indicator for the level of competition in a market.

A proper definition of the relevant market is the most important prerequisite for the HHI to reflect the level of concentration in an unbiased way.

EU merger guidelines offer some threshold values for the interpretation of the observed HHI:

> *The Commission is unlikely to identify horizontal competition concerns in a market with a post-merger HHI below 1,000. Such markets normally do not require extensive analysis.*[41]

The EC further gives values for the change in HHI, the ΔHHI, which is not of importance in our case. The EC Merger Guidelines finds a market with a HHI of between 1,000 and 2,000[42] as "unlikely to identify horizontal competition concerns". A HHI exceeding 2,000 is an indication for high concentration. The US Merger Guidelines sets a lower threshold at 1,800.

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[40] Follows the approach in Bishop and Walker (2002)
[41] European Commission, "Guidelines on the assessment of horizontal mergers under the Council Regulation on the control of concentrations between undertakings", (2004), §19
[42] ibid. §20

In the case of the refining industry within the defined geographic market, the HHI is calculated as follows:

$$HHI = \sum_{i=1}^{13} S_i^2 = 1058$$

A HHI of 1,058 points to at most a moderate concentration in the market concerned. Again, a merger of two of the bigger firms could raise concerns in the EC, as it was the case with OMV/MOL.

6.2. Horizontal Collusion

Though there are no reasonable grounds for regarding the refining industry in the market under review, as being afflicted, I would still like to take a brief look at the parameters favouring horizontal collusion.

Motta defines two elements that must prevail for collusion to arise:

- Participants must have the opportunity to observe deviation in a timely way
- There must be punishment (a price war)

He states further that collusion can only be able only if firms meet repeatedly in the market. Factors influencing the probability of collusion are as follows.

Small number of firms

In contrast to an industry with many active companies, where deviating from a collusive agreement is more attractive, in a sector with only a small number of firms the profit from deviating would hardly outweigh the punishment. In addition to this, a small number of firms eases coordination among the members of the cartel.

Symmetries in the industry

When calculating the Herfindahl-Hirschman index, one can observe that this measure of concentration rises with asymmetries in the industry. According to Motta (2007)

> *"one should expect an ambiguous relationship between concentration and collusion: such a measure confounds two factors – higher average market share and asymmetry – that affect collusion in opposite ways."*[43]

[43] Motta (2007), p. 143

A market with two firms, both holding 50% market shares, is evaluated with a HHI of 5,000. A market with two firms operating, one being dominant with 90% market share and the other holding only 10% results in a HHI of 8,200, which is much closer to monopolisation.

Though the first situation would be more critical, with regard to collusion, in the latter scenario the incentive for the market can be regarded to be high. Whether the small firm can threaten the market leader with effective punishment or is able to deviate oneself depends on capacity constraints. If no capacity constraints exist, the smaller firm has more incentive to deviate as it has little to lose and much to gain. To sum up, to assess the impact of symmetries on competition necessitates collecting further information about capacity constraints.

Buyer power

In the case of many suppliers and only few potential buyers, buyers' power is established. In such a market, sellers will refrain from collusive practices. When small, frequent orders are grouped into large and sporadic ones, the buyer can even break a collusive agreement as the incentive to deviate soars.

Concentration

A small number of firms holding substantial market shares clearly favours collusion; the same is true for symmetry and a higher average market share. A small number of competitors eases coming to a collusive agreement.

Probability of entry

The feasibility of entry of new firms into the industry is another key issue when assessing the competitiveness of oil refining industry. Legal provisions such as customs and industrial regulation, switching costs and lock-in effects are obstacles to potential entrants. The main obstacle arises when significant sunk costs accrue; this is obviously the case. Vast levels of investment in refining equipment and technology are necessary, not to mention the provisions needed to assure supply with crude oil (pipelines, harbours). Although an Italian refinery had been sold and relocated to Pakistan, such investment can be considered as not being easy to redeem. Again, the higher the probability of entry of new firms and the lower entry barriers to foreclose entrants, the worse the circumstances for collusive agreements.

Cross-ownership

Cross-ownership among competitors facilitates the exchange of information on prices and amounts and helps the firms monitoring each other to detect deviational behaviour. Cross-ownership has not been observed in the market for the time being except for certain refining sites and pipeline systems.

Demand price elasticity

A low elasticity of demand favours collusion as demand is supposed not to fall as rapidly when a trust raises prices. In contrast, high demand elasticity will cause a boom in demand after a firm deviates from a collusive agreement by lowering prices. The net effect is ambiguous but a lower elasticity will definitely cause a higher monopoly profit as demand is going down very slowly in reaction to an increase in prices.

Excess capacity

Excess capacity and technological advantage can serve as supplementary information as well. The availability of excess capacity again restricts the exertion of market power: If prices are raised, firms with spare capacity can step in and supply new customers if their product is substitutable enough. The degree of substitutability of refined products is quite high as long as legal regulations for components (sulphur, biogenetic agents) are fulfilled.

Product homogeneity

In a market with a large assortment of products, deviation is less profitable; a small decrease in price does not necessarily lead to a large shift in demand. On the other hand, product homogeneity, as it is more or less the case in the market for refined products, favours the entrance of firms from outside the market. Market entry in turn impedes collusion. In contrast, market conditions can be considered more transparent. Deviators from collusive agreements can be detected more easily

In short, it can be said that there does not seem to be much evidence that collusive behaviour occurs on the Central and Eastern European refining market in question. Neither the number of firms acting in the market is especially low nor are strong symmetries to be observed. There are several firms holding about 10% market share ranking behind the leading firms holding 16%, 14% and 12% respectively.

Cross-ownership has not been observed, except for certain facilities, and should be prohibited by law, as refined products can be considered very homogenous and demand elasticity regarding prices is quite low.

The threat of horizontal collusion seems largely manageable, but authorities should remain watchful – observing companies active in the market is easy and retail prices of oil products are publicly monitored.

6.3. Vertical integration

As has been frequently mentioned so far, most firms are vertically integrated to a high degree. This implies that most companies sell the oil products derived from

crude oil, which they have even explored and produced on their own, through filling stations or wholesale under the company's brand.

The crucial question in this context is whether vertically integrated firms are willing to supply independent retailers and wholesalers, which do not possess their own local refining capacity. If independent distributors are supplied, which prices do they have to pay? Will the integrated firm increase prices?

As before, the answers depend on other firms' ability to step in (e.g. spare capacity), the elasticity of demand for the input for the retailing firm which is low (which in turn implies low substitutability of products) and the probability of new suppliers entering the market.

Theory does not coercively predict an increase in price of the input for the retailers, when the integrated company ceases to supply as competitors could increase their output. This brings us back to the question of excess capacity.

If an integrated firm ceases to supply a good that is considered as input to the down-stream rivals, this is referred to as vertical foreclosure. If foreclosure occurs, this does not necessarily imply that the integrated affiliate in retailing is able to raise prices. Retail markets, being competitive enough, could prevent the firm from exercising market power and increasing retail prices. For the latter case it is compulsory that there exist other upstream firms with excess capacity or entry of new firms occurs – then it would not be a case vertical foreclosure. Motta concludes that:

> *"Vertical restraints and vertical mergers are anti-competitive only if they involve firms endowed with significant market power"*[44]

He also comes up with a proxy to exempt firms from investigation, i.e. firms with a market share below 20-30%.

During the assessment of the market under review, only one such case was observed: the case of MOL in Hungary. The company had increased its wholesale prices to a greater extent than the resale prices at its own filling stations. The EC prohibited this pricing policy.[45] Theory fits quite well to what occurred: Demand elasticity clearly was low – filling stations had to be supplied with the usual fuels. The local retail market can be considered, though dominated by MOL, as being sufficiently competitive. MOL is dominant in refining, wholesaling and retailing in Hungary.

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[44] Motta (2007), p. 377
[45] IEA, Energy Policies of IEA Countries, "Hungary 2006 Review", Paris, 2006, p. 115

The independent suppliers found it difficult to get other sources of supply and possibilities for entry did not disclose immediately. In addition to this, the geographical position of Hungary and the surrounding countries did not offer alternative sources of supply: Refineries in the east of the country belonging to another firm than MOL are far from being adjacent (Romania, Slovakia) and cross-border trade with the Ukraine may not be as simple seeing as the latter is not yet a member of the EU. The case represents an exception and is less likely to occur in other areas of the defined geographical market. In the end, the EC foiled MOL's intention and barriers to entry fell: Hypermarkets stepped into the market and supply from abroad was organized.

6.3.1. Abusive practices

There are some abusive practices dominant firms may adopt to deter firms from entering a market or force competitors to exit. In EU legislation those cases get dealt with under the headline "abuse of dominance" – incidents commonly occur after the liberalisation of an industry: The former state-owned dominant firm faces new competitors and tries to prevent them from gaining market share.

However exclusionary behaviour can be sometimes be difficult to differentiate from competitive actions. Price reductions may result from advantages in efficiency or the use of a superior technology but it may also be an attempt to prevent the entrant from making profits or to start a price war.

It is worth taking a closer look at market shares – if the firm using such practices is not dominant, the case may be not worth further analysis.

6.3.2. Essential facilities

An essential facility is any input which is deemed necessary for all industry participants to operate in a given industry and which is not easily duplicated. Access to a crude oil pipeline could be such an essential facility – a crucial prerequisite for the sensible operation of an oil refinery far away from oil harbours or in a land-locked country.

While building new refining premises is regarded as unlikely or even impossible due to neighbouring pressure groups, environmental regulation or bad prospects for reasonable capacity utilization, even existing refineries can be regarded as essential facilities. The most common example in literature that also may apply to this work is the case of specifically equipped ports. In contrast, facilities that provide only a minor advantage (e.g. deposits in the vicinity of the port of lading) cannot be accounted for.

The EC demands certain criteria to be met to declare a facility to be “essential”.[46]

- The facility has to be “impossible” to replicate – it has to be assessed whether another similar facility can be developed. It also may be not viable to create a second, similar asset. If the asset can be replicated at reasonable cost, the entrant should set up its own assets. Non-consideration could provide an incentive to free-ride when it comes to risky investments.
- There has to be no alternative way to enter the relevant market at a reasonable cost.
- There must be spare capacity on the asset – if no spare capacity exists, permitting access does not raise competition.
- There must be a lack of effective competition on the downstream market and a reasonable expectation that providing access to the facility improves the level of downstream competition.

The EC has been prepared to examine cases where the issue “essential facilities” arise though caution is due. Possible alternatives or existing spare capacity have to be considered before access to a facility is officially granted to a rival.

The reasons for being cautious in issuing obligations to share access are

- Such obligations curtail the property rights of the owner
- Firms get discouraged from investing into facilities and thereby from taking risk

The “essential facilities” problem arises in some cases of deregulation of former publicly owned premises and there has to be a difference made between rights of use, which can be redistributed, and investment in property.

A refinery can not be regarded as an essential facility because construction of a new site is viable (e.g. Sicily or the refinery in Spergau, Germany), even two or more refining sites in immediate vicinity is possible. With regard to crude oil pipelines things are a bit different: replicating a pipeline taking exactly the same route is not economically viable and using transport by pipeline may be without alternative. If there is spare capacity on a pipeline has to be decided from case to case. It is obvious that any entrant can not force a firm to curtail its throughput in order to free capacity. The last condition is hard to be met: markets for refined products are largely outlined and markets can be supplied, even if there exists no local refining site.

[46] Bishop, S. and Walker, M., (2002) p. 241-244

With regards to the industry under review, two rather radical approaches seem to be self-evident. A potential entrant either has to buy shares in existing refineries operated by a different firm or the entrant must take the risk of building a completely new refining site in a European country, maybe one in the east that does not currently exhaust its carbon dioxide emission rights. The first track may be the more plausible as investing into a complete new site entails considerable sunk costs and risks. Similarly, a supply of crude oil has to be arranged. The entrant would have to buy into an existing pipeline network as service is costly and freeloaders are not usually welcome. The question of existing spare capacity arises again with this particular issue.

The public sector is unlikely to enforce access to pipelines, as they have been privately financed in the past and national states are not likely to engage in such activities in the future. Furthermore, erecting new oil refineries is of questionable foresight – Europe suffers from surplus capacity in the area of refining and processing crude oil might be done in the oil-exporting countries in the future.

6.4. Challenges for the European Refining Industry – Conclusions

The relevant markets have been defined applying the Elzinga-Hogarty test regarding foreign trade flows, considering transport costs and the availability of means for bulk transportation. In addition to this, EC decisions have been revised and the definition seems to fit.

After having accurately defined the relevant markets, market shares were calculated. It turned out that the industry, consisting of 13 firms, is at most moderately concentrated and the status quo should not raise concerns with regard to competition.

However, may things change and a merger of two of the bigger companies should be viewed with caution as it could raise the market's concentration significantly and thus increasing the probability of horizontal collusion. Collusion at this time is not very likely, although such conditions have been met such as the possibility to observe deviation of a cartel member and the chance for punishment.

However, the number of firms is not low, there are no striking symmetries and retail prices are monitored by the public authorities.

Vertical integration of companies operating in the market is high and foreclosure of firms is theoretically possible. The Hungarian MOL started an attempt in 2005 to squeeze competitors out of the wholesale market for refined products. MOL's pricing policy was prohibited by the EC and the entry of new retailers with alternative sources of supply helped to stimulate competition. Certain products were concerned in a certain area of Hungary that is supposed to be the east of the country along the

border with Ukraine and Romania, which at that point in time was not a member of the EU. Being member of the common market in the EU can significantly facilitate cross-border trade.

In general each region of the market under review is within easy reach of a number of refineries, a fact that helps to ensure effective competition. Additionally, suspicion of collusion and vertical foreclosure can be mitigated by the existence of firms holding less than 20-30% market share. These thresholds have evidently not been exceeded; the largest market share of a firm is 16% followed by three competitors holding between 15-10%.

The feasibility of market entry eases concerns about anti-competitive behaviour. Barriers may arise from the large investment required that can be regarded as sunk costs or environmental regulation. Building new oil refining sites without abandoning other premises is not likely to occur. However, buying existing facilities from a firm already involved in refining is practicable.

Citing the example of Petroplus, a former Dutch and now Swiss refining operator, it entered the market in 1993, bought several refineries throughout Europe in recent years and boasts to be “Europe’s largest independent oil refinery operator” which appears to be the case. The firm’s equity is held by several investment funds and is also free-floating. This example shows that entry is feasible although the industry is ruled by the “traditional” highly vertically and horizontally integrated oil companies like BP, ExxonMobil, Shell or ENI.

Regardless of this fact, there are several challenges for the industry to meet. They arise regarding the output structure of Europe’s refineries and regarding the industry itself.

Europe has a chronic deficit in diesel production; diesel fuel even gets imported from the USA despite the distance. The deficit is in part caused by the lack of conversion capacity in European refineries. Conversion capacity makes it possible to increase the yield of light products such as diesel and enhance the output flexibility of combined production. The USA might have an advantage in this area because it processes the heavy, high sulphur crudes of the Middle East, whereas Europe prefers the lighter crude oils. The other factor is the preponderance of diesel-driven cars in the countries throughout Europe – production levels sometimes just do not meet the demand for diesel fuel.

Another big challenge for the industry is the permanent surplus capacity throughout Europe. In 2002 an EU-wide demand for 548 m tons contrasted with a capacity of 672 m tons. This is due in part to the tendency of oil refineries to migrate to oil-producing countries, which seek to increase their share of the value added.

This spare capacity temper competition concerns in the market, as there is sufficient capacity to counter a firm increasing prices. However, surplus capacity costs money and will not persist in the medium run.

Some inputs needed in the industry, like crude oil pipelines or even refining plants, can under certain circumstances be regarded as essential facilities without which no output can be produced. However, if entry into the industry or into a new operating area occurs, it is necessary to invest in pipelines and to ensure supply with feedstock for example and is deemed feasible.

It was noted that storage deposits and transportation are organized at a national level and are mostly dominated by the largest firm in the country.

However, it may be possible to gain a share in crucial companies or facilities. If efforts fail, politics may hurry to help, because ensuring “the reasonable supply of fuels to the population” is always a good pledge for any election.

Politics shall be the last point of my conclusion. Its role cannot be disregarded in the oil industry. Some companies are still part owned by the state and the idea of maintaining a national champion that calmly ensures supply is still popular. At the very least, a certain share should belong to domestic or “friendly” investors. Russian oil majors seeking to increase the vertical integration of their companies are not considered welcome by either the EU or national governments due to the recent disruptions to the supply of natural gas. But if the industry consolidates and companies have to be rapidly sold, things may change.

The picture drawn by the analysis carried out here does not reveal any serious threats to competition, but several events have shown that the industry must be closely monitored by national and European authorities.

7. Appendix

7.1. German summary/ Deutsche Zusammenfassung

Bei der vorliegenden Diplomarbeit handelt es sich um eine Industriestudie, die einen Einblick in die Ölindustrie, genauer die Raffination von Mineralölen und den Verkauf der Erzeugnisse im Großhandel. Um die Bewältigung dieses Vorhabens im Rahmen einer Diplomarbeit zu gewährleisten, habe ich mich auf den Raffineriemarkt in Mittel- und Osteuropa konzentriert, mit Österreich im Zentrum.

Untersucht werden soll die Wettbewerbssituation zwischen den verschiedenen Unternehmen, die ihre Produkte im Groß- und Einzelhandel an Zwischenhändler bzw. die Endverbraucher vertreiben.

Nach einer Einführung in die Industrie, in der Probleme Europäischer Dimension angesprochen werden, wie Überkapazitäten, fehlende Konversionskapazitäten und dem daraus resultierenden Mangel an Dieseltreibstoff werden grundlegende technische Vorgänge der Raffination von Mineralöl im industriellen Maßstab erklärt.

Die folgende Definition der relevanten Märkte ist von großer Bedeutung für die anschließende wettbewerbsökonomische Untersuchung: Wird der Markt zu „weit“ festgelegt, das heißt werden Regionen oder Produkte inkludiert, die in der Tat eigene Märkte darstellen, so wird eine wettbewerbspolitisch Besorgnis erregende Situation womöglich als unbedenklich angesehen. Umgekehrt, können bei zu „enger“ Marktdefinition Bedrohungen für den Wettbewerb – etwa in der Form hoher Konzentration – festgestellt werden, obwohl andere, nicht eingeschlossene Produkte oder Gebiete den Wettbewerb aufrechterhalten.

Das Konzept des SSNIP-Tests wird eingeführt, hierbei wird gefragt, ob es für einen etwaigen Monopolist profitabel wäre, seine Preise dauerhaft um 5-10% zu erhöhen. Da dieses Konzept aus Mangel an Daten nicht anwendbar ist, müssen Indizien gesammelt werden um die Gestalt der relevanten Produktmärkte sowie der relevanten geografischen Märkte abzugrenzen. Durch die Analyse möglicher Transportmittel und Wege für den Transport von Rohöl und Mineralölprodukten, die niedrige Eigenpreiselastizität von Diesel und Benzin wird der Schluss gezogen, dass Rohöl und durch Raffination erzeugte Produkte als nicht im selben Markt befindlich anzusehen sind. Mit Hilfe des Elzinga-Hogarty-Tests, der Handelsströme untersucht und der Durchsicht relevanter Entscheidungen der EC wird ein durch Österreich, Tschechien, Slowakei, Ungarn und Teilen Italiens’ und Deutschlands’ konstituierter geografischer Markt abgegrenzt.

In der Folge werden die genannten Länder einzeln hinsichtlich Raffinerien, deren Eigentümer, Kapazitäten und Produktion, untersucht. Auch der Transport und die Lagerung von Rohöl und Fertigprodukten wird einer Analyse unterzogen. Der Elzinga-Hogarty Test ergibt, dass keines der Länder einen eigenen Markt für sich darstellt und in der Folge wird der relevante Markt konkret abgegrenzt. Für diesen Markt werden Marktanteile und Konzentrationsmaße berechnet, kein Unternehmen hat jedoch eine marktbeherrschende Stellung inne. Eine Fusion von zwei der größten Unternehmen würde jedoch eine Untersuchung der EC auslösen. Absprachen zwischen den Marktteilnehmern sind eher nicht wahrscheinlich, da Preise behördlich beobachtet werden und Markteintritte neuer Konkurrenten sowohl im Einzel- als auch im Großhandel möglich sind. Durch die, sowohl horizontal als auch vertikal in hohem Maße integrierten, Unternehmen kam es in der Vergangenheit zu Versuchen Mitbewerber vom Markt zu drängen oder deren Eintritt gar nicht erst zuzulassen. Solche, den Wettbewerb schädigenden, Praktiken sind auch in Zukunft möglich und müssen von den Behörden dementsprechend verhindert und geahndet werden.

Am Ende der Arbeit wird außer auf den Wettbewerb betreffende Belange, noch auf den anhaltenden Einfluss der Politik und auf notwendige strukturelle Änderungen eingegangen.

7.2. Curriculum vitae

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Education and training	2004 - 2009 Diploma Study of Economics at the University of Vienna 1998 - 2003 Vienna Business School, HAK I Passed with merit 1994 - 1998 Secondary School, Rosasgasse 1-3, 1120 Vienna
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7.3. Affirmation/Eidesstattliche Erklärung

Ich erkläre hiermit an Eides Statt, dass ich die vorliegende Arbeit selbständig und ohne Benutzung anderer als der angegebenen Hilfsmittel angefertigt habe. Die aus fremden Quellen direkt oder indirekt übernommenen Gedanken sind als solche kenntlich gemacht.

Die Arbeit wurde bisher in gleicher oder ähnlicher Form keiner anderen Prüfungsbehörde vorgelegt und auch noch nicht veröffentlicht.

Wien, im Juni 2009

Unterschrift
(Georg Kölbl)

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