

Department of Economics and Finance

*Bachelor degree thesis in
“Financial Markets and Intermediaries”*

Oil price, a focus on the recent collapse

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Introduction

This thesis aims to analyse the crude oil market, focusing in particular on the price of crude oil, and to study the recent oil crisis of 2014-2015 by investigating the major issues and backgrounds. It will begin with an analysis of the main determinants of crude oil price by focusing on the main factors that can be attributed to crude oil price variations, in order to get a better picture of the recent price collapse of crude oil. This is essential since crude oil is a global issue and the price of oil affects a variety of goods and services worldwide, due to many commodities using oil as an energy source. The structure of the crude oil market will be examined, by highlighting the main points that comprise this complex marketplace. There will be a focus on what kind of market structure crude oil has; characterizing it as an oligopoly. Subsequently, the main differences between OPEC and non OPEC countries will be discussed, followed by the main steps of the crude oil supply chain and identification of the main competitors in the market. After having analysed these two topics, the analysis moves to the issues and background of the recent price collapse, also considering future price changes. This section takes into consideration who benefits and who is harmed by the recent price fall. Lastly, the impact of OPEC's cartel on the global crude oil market will be discussed, comparing the recent price collapse with the crisis of 1973.

In summary, the first chapter defines the different drivers that impact the trend of crude oil prices.

The second chapter starts outlining the oil market structure as an oligopoly. It highlights the core distinctions between OPEC and non-OPEC countries. Next it labels the complex supply chain from the production process to the ultimate distribution of crude oil, evaluating lastly the main competitors in the field.

The third chapter starts investigating the issues and backgrounds of the recent price collapse of crude oil, considering also the possible future price changes. It outlines the main losers and winners of the price fall and compares OPEC's major influence on the global crude oil market in this crisis to the impact it had at the time of the embargo in 1973.

1.Determinants for the oil price

1.1 Demand

The primary drivers of global oil demand are population growth, supply availability, economic activity, consumption patterns, efficiencies in use and the exchange rate.

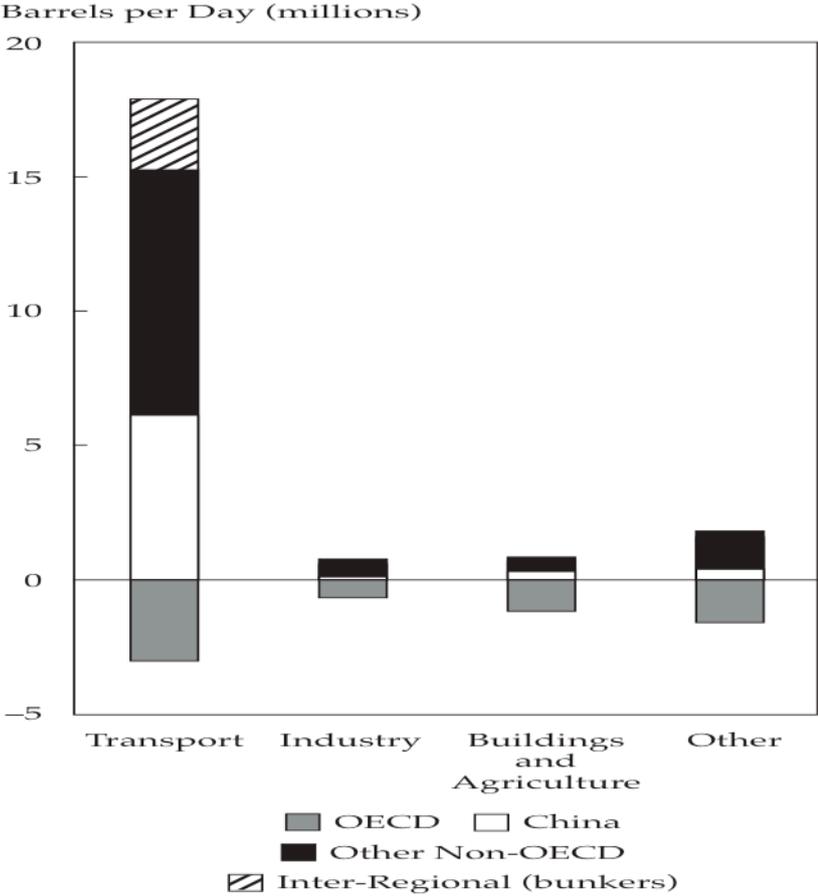
Population growth is strongly connected with oil production, from the very first time that oil entered into common use around 1900 when the global community was around 1.6 billion.¹ Since then the population has quadrupled. Currently population growth is more apparent in emerging marketplaces such as China, India and Africa and this will have a strong impact on oil demand and prices. Population growth will lead nations to spread their projected consumption on oil and thus enlarge their economies.

The change of economic activity of a country has a positive link with the variation in crude oil prices. A growth in economic activity will denote an upturn in prosperity and thus demand for energy. A decline in economic activity will instigate a narrowing in consumption of crude oil and the necessity to alternative lower cost energy sources, by impacting the pattern of crude oil prices.

The main driver in oil consumption patterns is transportation. Crude oil is used to move vehicles such as trains, airplanes, cars and other machines. The higher the price of crude oil, the higher the associated costs for companies competing in the transport sector will be. This will also have an impact on the final consumer, who will suffer more expenses. Lower oil prices will benefit both companies and consumers by reducing their associated costs. The figure 1.1 displays the future expected change in demand for distinctive industry sectors and economic regions from 2009 to 2035. The figure 1.1 shows that China and other non- OECD countries are expected to increase their consumption of oil for the transportation sector, thus greatly affecting the demand for oil.

¹ Chefurka,P., 2007

Figure 1.1 – Oil Demand by Various Sectors and regions 2009-2035



Source: Based on Data form the International Energy Agency World Energy Outlook, 2010

The improving efficiency of oil is another important aspect that defines the demand for this unique natural resource. The use of higher quality crude oil fuels is greater today than it has been in the preceding 20 years. This productivity can be mirrored in the progression of increased automobile efficiency and greater heavy transport efficiency. Cars are able to drive more miles by significantly reducing carbon emissions. The threat of hybrid, electric and alternative energy resources may change the demand for oil and have an impact on oil prices. The improvement of such alternative means is mainly due to the uncertain expected supply availability of oil in the future. For some analysts such as the US Energy Information Administration’s (EIA), the global supply of crude oil is estimated to be satisfactory to meet the world’s demand for liquid fuels for at least the next 25 years.

Lastly, demand for crude oil is dependent on fluctuations in the exchange rate, which has a great impact on oil prices. The trading value of crude oil is represented in dollar terms, for the reason that the US economy has remarkable features such as macroeconomic stability, deep financial markets and global trade power, facilitating the adoption of the US dollar to

offer a store of value and price transparency in the oil market. When the US dollar depreciates versus other currencies, nations with non - dollar currency have cheap oil, while buyers in US dollar currency pay a higher price for the equivalent barrel of oil. Variations in the US dollar will influence global oil demand. An appreciation (devaluation) of the US dollar with respect to other currencies will upturn (drop) the cost of buying a dollar and hence also a barrel of oil. This will lead to a decrease (increase) in the demand for crude oil from currencies other than the US, and also the price. From this we can tell that we have a clear negative relationship between the US dollar exchange rate and changes in the crude oil price.

The analysis will now move to the second factor; supply, which is another main driver in affecting changes of crude oil prices.

1.2 Supply

The supply of oil is managed mainly by the Organization of the Petroleum Exporting Countries (OPEC), which ventures to regulate production targets for its representative countries. OPEC adjusts its production objectives depending on recent and expected supply and demand statistics. These valuations are very challenging when market circumstances are unclear and fluctuate very rapidly. OPEC members make 40% of the world's crude oil and denote about 60% of the total international petroleum trade.²

OPEC's operations can and do impact the price of oil internationally due to their large market share. This is especially true of Saudi Arabia, OPEC's major manufacturer, whose crude oil production levels often affect oil prices. OPEC spare capacity stipulates a measure of the global oil market's capability to react to potential crises that diminish the oil supplies. With spare capacity in this context, we mean not the volume of inventory level available of crude oil, but rather the actual production capacity that can be drawn on immediately. More precisely EIA defines spare capacity as "*the volume of production that can be brought on within 30 days and sustained for at least 90 days*".³ Saudi Arabia has the largest spare capacity in the world, keeping up more than 1.5-2 million barrels per day.⁴ Oil prices are

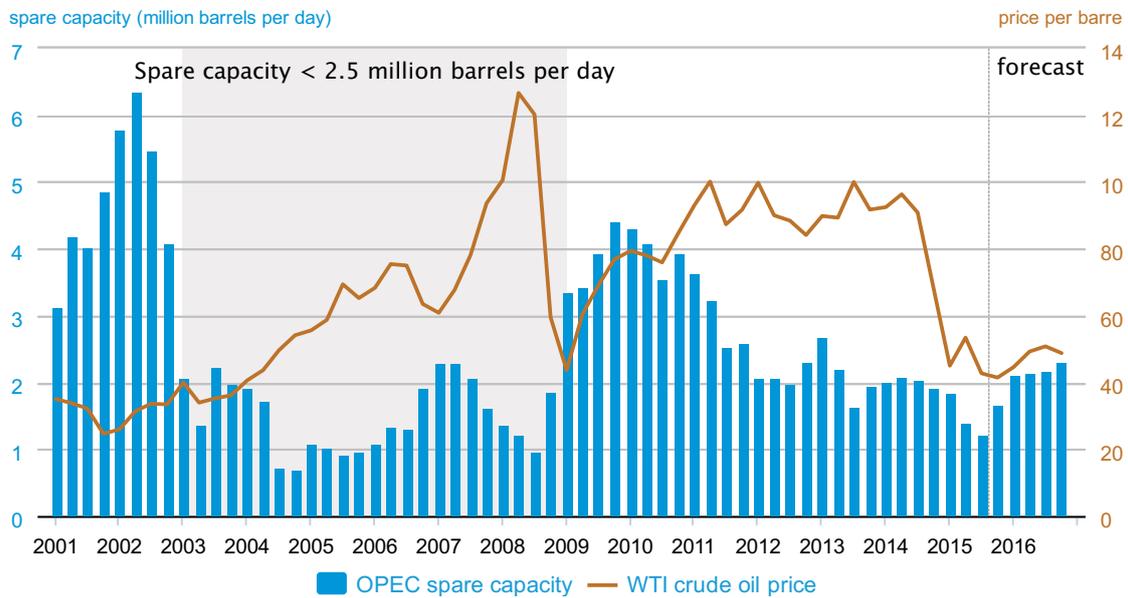
² <http://www.eia.gov/finance/markets/supply-opec.cfm>

³ <http://www.eia.gov/finance/markets/supply-opec.cfm>

⁴ *ibidem*

prone to a rise in risk premium if OPEC spare capacity touches low quantities. Therefore, changes in the OPEC spare capacity can strongly impact oil prices.

Figure 1.2- OPEC spare production capacity and WTI crude oil prices



Source: U.S. Energy Information Administration, Thomson Reuters.

Figure 1.2 illustrates OPEC spare capacity and WTI crude oil price per barrel (2010 real dollars), over the period 2001-2016. We can see that between 2001 and the end of 2002; OPEC spare capacity was at its highest volume, reaching its peak in 2002 by almost 6.3 million barrels per day. Due to this high spare capacity WTI crude oil price remained below \$40 per barrel, but from 2003 on OPEC spare capacity decreased significantly and WTI crude oil price began to rise, reaching \$40 per barrel. The grey shaded area from 2003-2008 highlights price increases due to OPEC’s inability to respond to increased demand. The price of crude oil was elevated dramatically during this period, reaching its highest value in 2008. The price rose from \$40 per barrel to almost \$122 per barrel, growing in annual terms an average of almost 51%. From 2008-2009 during the financial crisis the price dropped enormously, falling to almost \$45 per barrel. The price variation was approximately 63%, with respect to its highest value of \$122 per barrel.

OPEC spare capacity rose again substantially over the following two years, but at the same time the crude oil price recovered quite rapidly, increasing to \$80 per barrel and then increased further, reaching \$100 per barrel at the beginning of 2011. From 2011 onward OPEC spare capacity decreased and remained stable, fluctuating at around 2.5-1.7 million

barrels per day, and prices averaged around \$100-\$80 per barrel, dropping significantly from mid 2014 to almost \$42 per barrel. Expectations in 2016 of OPEC's spare capacity are quite stable, averaging around 2.3 million barrels per day and prices should increase slightly to \$45 per barrel. From this chart we have seen that OPEC spare capacity has an impact on crude oil price, but these price variations are not only due to OPEC spare capacity, they can be attributed to other factors such as demand or global factors such as weather and severe events or crisis as in the period of 2008-2009.

OPEC's objective is to control production levels in order to keep prices at their targeted values, but often affiliated countries do not adhere to the production targets laid out by OPEC. Oil prices can be altered by associate countries' unwillingness to uphold production targets. The international oil market is heavily politicized as government-run companies control the majority of global oil reserves and production. Production quotas are often debated because some member countries desire a decrease in production levels to raise oil prices which will in turn increase their own revenue. These appeals are in contrast to Saudi Arabia's affirmed long-term strategy to collaborate with the world's economic powers in order to safeguard oil levels which will back economic expansion. Saudi Arabia stresses that a core part of this policy asserts that supply uncertainty or increased oil prices will encourage developed nations to safeguard and cultivate different fuels. In September 2008 a dispute occurred when Saudi Arabians reportedly left an OPEC negotiation session in which the organization designated a reduction in production. Although Saudi Arabia delegates officially recognized the change in production quotas, they anonymously declined to observe them. The New York Times mentioned such an anonymous OPEC delegate as saying "*Saudi Arabia will meet the markets demand. We will see what the market requires and we will not leave a customer without oil. The policy has not changed.*"⁵ These examples demonstrate that political issues in particular affect the trend of the global oil market. Not only political, but also environmental issues contribute to government interventions on the crude oil market. An example of an environmental issue was the ban of drilling in the Gulf of Mexico, established by the federal US government, which includes offshore Florida and part of offshore Alabama, to avoid the risk of oil spill. We know how dramatic the oil spill in the Gulf of Mexico in 2010 was, and its devastating lateral effects on the natural environment. This ban of exploration affects commodity markets, marking this as potential damage to crude oil supply and, as a result, driving up prices. Moreover, the level of taxation on crude

⁵ Mouawad J. 2008

oil imposed by governments affects crude oil prices significantly. Furthermore, unforeseen supply disruptions and uncertainty concerning the capacity to restore output also influence oil price considerably.

1.3 Futures Market

A third factor that is very important in altering the crude oil price in the global market is the future markets. A Future contract is a financial derivative that enables investors to hedge against the risk of market instabilities. It is an arrangement between two parties engaging in a financial operation by buying and selling a certain asset of definite quantity, at a pre-set price, at an upcoming point in time. The payment and transfer of the asset is completed on the future date labelled as delivery date. In future contracts, the purchaser is identified as holding a long position, and the dealer in the future contracts is said to have a short position. There is no option of arbitrage at the expiry date, since the price of the contract will be the same as the price of the original asset conveyed. These deals are operated in the Chicago Board of Trade, Chicago Mercantile Exchange and the New York Futures Exchange. Future markets allow “price discovery”, in the sense that, due to its extremely competitive environment, future markets has become an important economic device to define prices based on today’s and tomorrow’s expected volume of supply and demand. Future markets depend on an endless stream of news throughout the world and thus necessitate a high amount of transparency. Aspects such as weather, war, debt default and many others can all have a significant influence on supply and demand, and as a result the current and upcoming price of a commodity. This torrent of information and the way people absorb it regularly changes the price of a commodity and this practice is known as “price discovery”. In the financial market many participants with different goals and objectives do crude oil trading. Several, such as oil producers and airlines, have an imperative commercial exposure to deviations to oil and petroleum based fuels prices, and may pursue to hedge their gamble by buying and selling energy derivatives. For example an airline business would acquire futures to hedge against the risk of a future upturn in oil price, by wedging it at a reasonable price, whereas an oil maker may seek to sell futures to protect a price for its future output. Other traders such as banks and hedge funds, who normally are not interested in dealing physical oil, are also operating in the market for energy derivatives to attempt to gain from variation in prices. The scheme of complementing energy and adding commodities as substitutes to

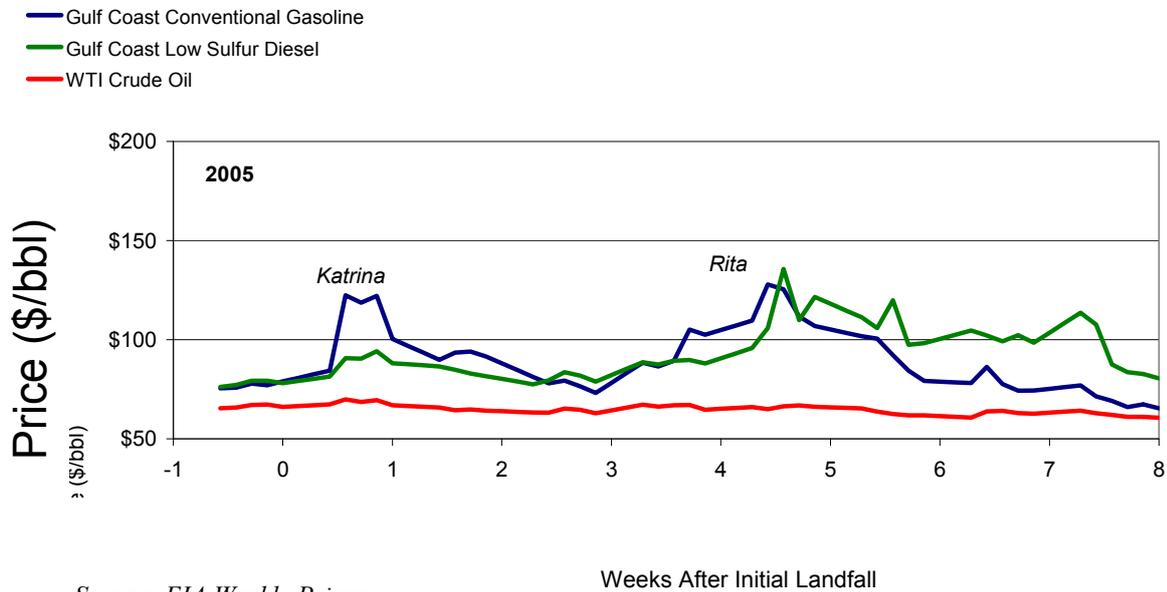
equity and bond investments by investors is predominantly done to vary their portfolio by lessening their overall risk.

The question of speculation in future markets is widely discussed by many analysts and researchers. Speculation can be defined as the act of purchasing something today with the anticipation of selling it at a higher price at a later date. An example of speculative buying would be the following: a trader purchases a futures contract, a contract where the oil is received at a later date; the trader then sells it before the oil is delivered and utilises profits to buy an additional future contract with an even further due date. Funds are invested in these contracts with the expectation that oil price will increase over time, and when demand increases for future contract, their price also increases, which affects the current oil price. The problem is whether speculative buying implies big changes in the trend of oil prices. Most argue that the price of oil is driven mainly by market fundamentals such as demand and supply. The speculation act can impact in some way the short-term price volatility, but in the long run most analysts claim that other factors play a more significant role. So the debate is very open and subjective.

1.4 Seasonal weather and severe events

A fourth factor that is quite strong in influencing crude oil prices are seasonal weather changes and severe weather events. Depending on the period the force that drives variations in the oil prices are divergent. In summer many people are travelling for their holidays and thus growing their demand for oil, leading to an increase in the oil price. Cold seasons can result in higher heating fuel requirements having a positive effect on crude oil prices. A tepid winter can cause oil prices to fall. Severe episodes such as hurricanes can have a substantial influence on oil prices. In 2005 two hurricanes (Katrina and Rita) inflicted widespread destruction to Gulf of Mexico onshore oil refineries and offshore oil and natural gas rigs and pipelines. Supply interruptions were a significant consequence of this natural event, due to the significant alteration of spot prices of oil. From figure 1.2 we can grasp the effects of the two hurricanes on selected petroleum spot prices.

Figure 1.2 - Selected Petroleum Spot Prices during 2005 Hurricane



Source: EIA Weekly Prices

The value of West Texas Intermediate, one week before the hurricane of Katrina, was close to \$65 per barrel, the spot price of wholesale gasoline in the Gulf was \$75 per barrel and the spot diesel price in the Gulf \$76 per barrel. Notwithstanding that the price of WTI crude oil didn't surge considerably during Katrina and Rita, the US wholesale Gulf gasoline spot prices took off nearly to \$125 per barrel after Katrina and more than \$125 per barrel after Rita. Diesel prices were moved remarkably in the week after Rita, increasing spot prices to more than \$135 per barrel. This chart demonstrates that severe weather events greatly impact upon the trend of crude oil prices, thus making it a very important determinant.

2. The market structure of crude oil

2.1 Oligopoly market

The crude oil market is structured as an oligopoly in which the production of crude oil is held by few organizations. In this marketplace some oil holding nations colluded in a big cartel, which is a main feature of oligopolistic markets. By colluding members can act as monopolists and can have the benefit of higher returns in the long term. OPEC cartel is an example. It is an oligopoly because there is interdependence among the actors since one's actions affect all. Participants need to take into account the potential reaction of their opponents when constructing their personal choices. As we will see in the following chapter, the unchanged production decision of OPEC's cartel, made in November 2014, has further affected the trend of oil prices by harming other non-OPEC producers until today. This market is characterized by high entry barriers, which impede the access of new entrants, due to their high initial set up cost and also to the limited extraction locations of crude oil. Artificial barriers are also present in the oil industry. Superior knowledge plays a key role in this context. Existing oil companies have a very good understanding of the market and are always building up new acquaintances, making entry even more difficult for new participants. There are high research and development costs since particular extraction technologies are needed. The "fracking" technique is one of the most recent developments in this field. Most oil and gas companies and geologists have always known that there are pockets of oil and natural gas under large rock formations and big layers of rock. It was impossible to obtain it by drilling straight down, so this process is done horizontally through hydraulic fracturing, also called "fracking". The procedure is hydraulic, because water, lots of chemicals, sand and other things, are used to fracture the rock by pushing out the oil at a very high speed. It crushes the rock and releases the oil and natural gas. Extraction by "fracking" is limited in the US and most of the "fracking" is done in North Dakota and in parts of Pennsylvania. The problem with "fracking" is that the chemicals used in the process may get into contact with ground water, contaminating the drinking water. The chemicals are dangerous but companies promise that ground water is safe from contamination since there is a lot of space and a lot of rock between the "fracking" operation and the drinking water source.

2.2 OPEC versus non-OPEC producers

OPEC is an international cartel of oil producing countries (“Organization of the Petroleum Exporting Countries”), which was established in September 1960 by Venezuela, Saudi Arabia, Kuwait, Iraq and Iran. Later on other members joined it: Qatar, Libya, United Arab Emirates, Algeria, Angola, Ecuador and Nigeria. Its headquarters are in Vienna, Austria. It produces 40% of global daily crude oil consumption.⁶ According to current valuations, more than 80% of the world’s oil provisions can be traced to OPEC countries,⁷ and Middle Eastern reserves accounting for around 66% of the OPEC total.⁸ The three largest OPEC member crude oil shares are Venezuela, Saudi Arabia and Iran, respectively with 24.9%, 22.1% and 13.1%.⁵ OPEC aims to manage and combine its members’ oil policies and to guarantee the maintenance of oil markets, which will ensure the efficient, economic and steady supply of oil to consumers, a consistent income to producers and a fair return on capital for investors. However, the OPEC mandate is not always fully respected, sometimes OPEC’s decisions are based on the cartel’s interests. Oil production from non-OPEC countries, such as Mexico, United States, Canada and Russia, represents about 60% of world oil production.⁹ OPEC crude oil production is regulated by a centralized system, with respect to non-OPEC producers, that makes independent decisions about oil production. Another significant difference is that in OPEC countries oil production is run by government companies, while in non-OPEC countries most production is managed by national, international or investor owned oil companies.

Source:

⁶ <http://www.eia.gov/finance/markets/supply-opeccfm>

⁷ http://www.opec.org/opec_web/en/data_graphs/330.htm

⁸ <http://www.eia.gov/finance/markets/supply-opeccfm>

⁹ <http://www.eia.gov/finance/markets/supply-nonopeccfm>

2.3 Oil Supply chain

The Oil Supply Chain involves several activities that begin with extracting crude oil at its source, and end at the final consumer. Such activities are: production, which includes location, extraction and transportation of crude oil; refining, a process in which crude oil is elaborated into a final product, for example into gasoline; and distribution, which focuses on delivering a product to the final consumer.

2.3.1 Production

Over millennia the decayed matter of dead prehistoric organisms is compacted into the earth's sedimentary layers, turning them into natural gas and crude oil. The creation of crude oil requires large quantities of decomposing maritime creatures and plants, a stratum of water-resistant rock to halt the oil evasion, a porous reservoir rock and millions of years. As oil is formed deep underground, it is hard to discover. Due to this, nations hire geologists to excavate and determine where oil can be located. They undertake huge investigations, drawing on knowledge of rock configurations, gravity meters, seismology, satellite imagery and further tools to discover oil bases. In the common method of seismology, shock waves are emitted, which then reflect back and convey whether oil is present. Geologists then use GPS coordinates and marker buoys to demonstrate the location of oil. Next, drills or oilrig systems are introduced, which will obtain crude oil from underground. In order to obtain oil from the ground, a drilling scheme is necessary. Rotary drill rigs begin by creating a hole that extends for thousands of metres. Steel pipes are driven underground, then marked out with cement protectors. Cracks are created deep underground, the crude oil seeps into these cracks. The rotary drill rig is replaced with a pumping unit, which retains the flow of oil. This pushing unit begins syphoning the oil, and as soon as the oil starts working under pressure the unit is turned off to preserve energy and money. One of the main dangers of drilling oil is an explosion; there is a constant threat of detonation due to the excessive heat produced in the penetrating activity and the possibility of gas that might be let out through the process. The 2010 BP explosion on an oilrig in the Gulf of Mexico, dubbed "Deep-water Horizon disaster", killed eleven rig employees, and released oil into the ocean, with devastating effects on the area's wildlife, it has been called one of the worst environmental tragedies in US history. Oil spills are an ongoing concern and occur in too many instances. Therefore, drilling, specifically offshore, is a danger to

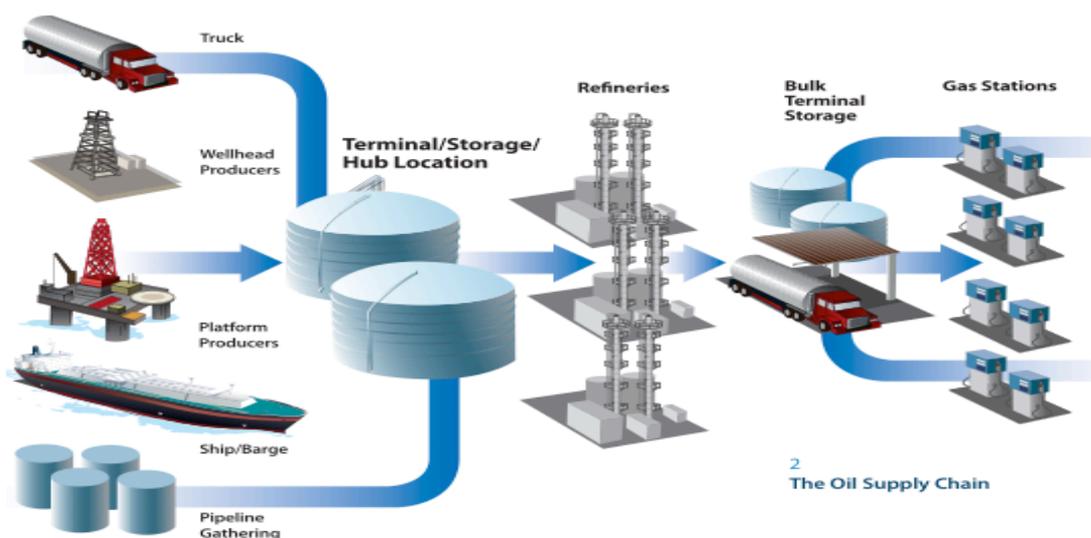
human lives and the surrounding ecosystem. The new technology of “fracking” (see above) creates further concerns at an environmental level.

2.3.2 Refining and Distribution

Crude oil must be refined in order to become a usable product, such as fuel. Crude oil refinement requires isolation of its hydrocarbons, which are then broken down into diverse substances. Hydrocarbons can be detached using a scientific effect called “cracking”. The process of fractional distillation “cracks” the oil by boiling crude oil in order to vaporize and then condense the elements, syphoning them off at various temperatures. Products such as diesel and petrol are created through this procedure, with the addition of dyes and additives, which enable them to be legal fuels. The diesel and petrol is later sent to division epicentres before being shipped to local service stations.

To recap, all of these processes occur within a global market place; an extensive infrastructure links global buyers and sellers, sustained by an international financial market. This physical infrastructure comprises an enormous quantity of capital, including drilling rigs, pipelines, seaports, barges, trucks, tankers, crude oil storage facilities, refineries, product terminals, retail storage tanks and gasoline pumps. The figure 2.1 below makes the spectrum much clearer.

Figure 2.1- The Oil Supply Chain



Source: US Energy Information Administration, *International Energy Outlook 2005*, Table A2

2.4 Alternatives to oil

One of the threats to crude oil is renewable energy such as wind, solar, hydropower and biofuel. In recent times these energy sources have been gaining ground in the world market, having a lot of importance for their favourable effects to our climate, health and economy. Human activity is filling the atmosphere with carbon dioxide and other global warming emissions, which trap heat, steadily drive up the world's temperature and generate substantial damaging effects on people's health, and the world's environment and climate. Increasing the supply of renewable energy would allow many countries to replace carbon intensive energy sources and significantly reduce global warming. For instance in the US electricity production accounts for more than one-third of US global warming emissions, with the preponderance produced by coal-fired plants, which produces roughly 25% of the US's total global warming releases.¹⁰ Conversely, most renewable energy sources produce almost no global warming emissions. Creating electricity from renewable energy rather than fossil fuels offers noteworthy public health paybacks. The air and water pollution released by coal and other natural gas plants is associated with breathing difficulties, neurological damage, heart attacks, and cancer. Electricity generated through wind, sun and hydroelectric power are not associated with air pollution releases. In addition wind and solar energy require essentially no water to operate and thus do not pollute water resources. In contrast fossil fuels can have significant impact on water sources, as described in paragraph 2.1 through the "fracking" system. Switching fossil fuels with renewable energy has been discovered to diminish premature mortality and it cuts total health expenses. Another argument is that renewable energy industries are more labour-intensive compared to fossil industries that are typically more mechanized and capital focused. Therefore, more jobs can be formed for each unit of electricity made from renewable bases than from fossil fuels. In 2009 the Union of Concerned Scientists directed an inquiry of the economic settlements of a 25% renewable energy standard by 2025.¹¹ It discovered that such a plan would build more than three times as many contracts as generating an identical quantity of electricity from fossil fuels, generating an extra 202 000 new jobs in 2025.¹² The costs of using renewable energy technologies are steadily

¹⁰ http://www.ucsusa.org/clean_energy/our-energy-choices/renewable-energy/public-benefits-of-renewable.html#.Vh-CwWQrKrc

¹¹ http://www.ucsusa.org/clean_energy/our-energy-choices/renewable-energy/public-benefits-of-renewable.html#.Vh-CwWQrKrc

¹² *ibidem*

declining and expected to fall even more. For example, since 2011 the average value of solar panels has plummeted by almost 60%.¹³

Wind turbines declined by 20% between 2010 and 2012.¹⁴ The forecasts of renewable energy for mankind are excellent and competition is fierce in the oil industry sector, which fears to be cut down considerably in the near future. Barack Obama's "Clean Energy Plan" speech on August 3 2015 captures the severity of the approaching situation. Obama described a meticulous new energy scheme that intends to reduce carbon flow from power plants in the US by a third by 2030. The plan sets the US moving towards renewable energy. The climate change experienced over recent periods will not only cause problems in the near future, it is also costing the US money, and many people their lives, due to the extreme weather events such as floods, droughts, wildfires and major storms. It will get even worse. Obama's administration has been working methodically with the Environmental Protection Agency to link the plan straight to healthcare disputes, exhibiting how it will prevent premature fatalities due to exposure to coal plants, and safeguard children from the increasing incidences of childhood asthma. Obama projected some other elements of his climate regulation meant to cut all greenhouse gas releases by 26-28% by 2025.¹⁵ This would particularly influence the ordinary life pattern for many American people, such as new vehicle releases norms, a solar training plan and ways to aid the coal industry in making the move to renewable energy.

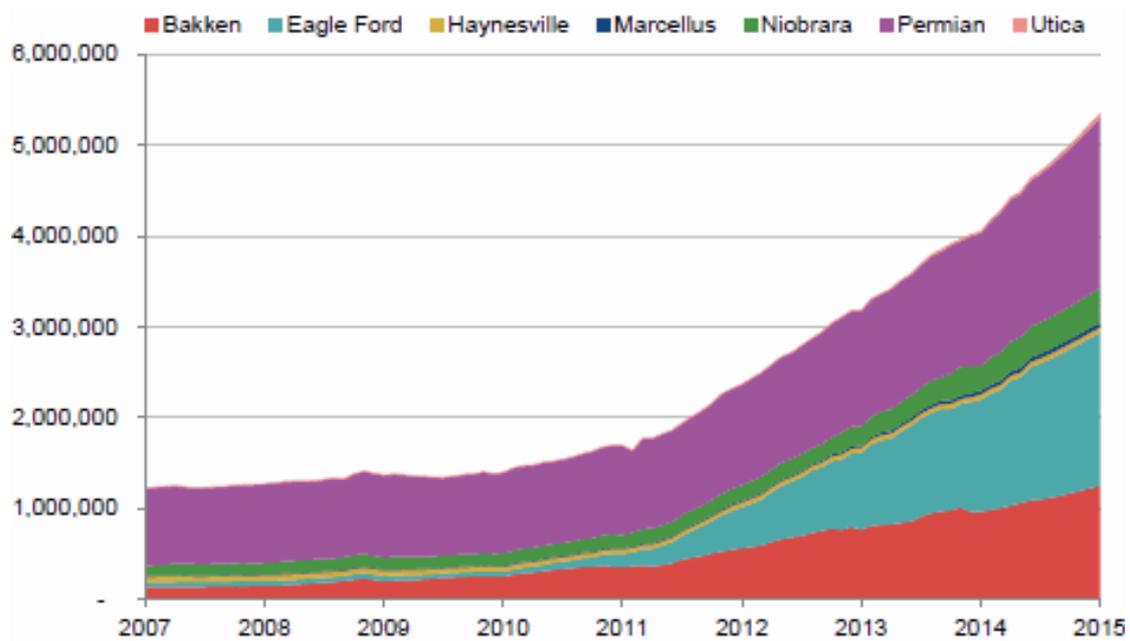
Another major competitor of crude oil is shale oil. Shale oil is an alternative to conventional oil and it is extracted through horizontal drilling from big rock formations, especially through the "fracking" technique. Shale oil production has increased considerably in the US and there are significant investments announced globally. The figure 2.2 shows the yearly US shale oil production growth, of seven key productivity regions, over the period 2007-2015.

¹³ ibidem

¹⁴ ibidem

¹⁵ Walker, A. 2015

Figure 2.2- US Shale Oil production



Source: US Energy Information Administration

The production of shale oil in the US from 2007 to the end of 2012 grew significantly from 1.3 million barrels per day to nearly 2.5 million barrels per day, registering around 92% growth rate over the whole time period. In terms of yearly growth rate, shale oil production increased about 18.4% per year. If we analyse the net contribution of each region out of total production, the productivity in Permian was significantly higher with respect to the others. Beginning in 2007 with a production around 800 000 barrels per day out of 1.3 million, and giving a contribution of approximately 62% with respect to total production. In 2012 Permian productivity increased further, but other regions also improved production, especially Eagle Ford and Bakken. The last two contributed a larger total production amount in relation to 2007, both of 400 000 barrels per day. From 2012 on shale oil's total production grew dramatically. The following three years total output reached up to 5.3 million barrels per day, an aggregate production growth rate of roughly 112%, in yearly terms 37.3%. An outstanding amount, and if we analyse the last three years Eagle Ford and Bakken's production contribution was more marked in comparison to the other regions. Bakken only contributed around 1,3 million barrels per day in 2015, roughly 25% of total production, and Eagle Ford noted a production activity of 1,5 million barrels per day. If we measure in percentage terms, of the total production, we get approximately 28% contribution. Investments in shale oil production in the US over the last eight years are substantial. This dramatic increase of shale oil should slow down, according to forecasts of the

US Energy Information Administration.¹⁶ Future shale oil production by US is expected to increase by 1.2 million barrels per day by 2035. However, these estimates appear moderate in comparison to other market analysts who predict that the production of shale oil in the US should go up to 3-4 million barrels per day by that date.¹⁷ Other countries besides the US are investing in shale oil production. According to analysis and projections done by EIA at the beginning of 2014, the technically recoverable resources of shale oil and shale gas in the US and around the globe have been estimated.¹⁸ More than half of the identified shale oil resources are concentrated within four countries: Russia, China, Argentina and Libya. From figure 2.3 we see that the US is ranked as second for shale oil resources.

Figure 2.3- Top 10 countries with technically recoverable shale oil resources

Rank	Country	Shale oil (billion barrels)	
1	Russia	75	
2	U.S. ¹	58	(48)
3	China	32	
4	Argentina	27	
5	Libya	26	
6	Australia	18	
7	Venezuela	13	
8	Mexico	13	
9	Pakistan	9	
10	Canada	9	
World Total		345	(335)

Source: EIA estimates used for ranking order: ARI estimates in parenthesis

EIA warns that these estimates are not fully reliable and they will remain so until they are significantly tested with production wells. The approach adopted by this report was to estimate shale resources outside the US and it was grounded on the geology and resource recovery rates of comparable shale oil formations in the US that have produced shale oil and shale gas from thousands of producing wells. By showing this last chart we got a hypothetical picture about the shale oil resources around the globe and the potential investments of other countries in this business sector. The effect of shale oil may alter the world's energy markets in the future,

¹⁶ EIA Annual Energy Outlook

¹⁷ See recent projections from Citi Energy 2020, IEA World Energy Outlook 2012, Credit Suisse US Oil Production Outlook (September 2012), HIS Cera, and BP Statistical Review 2012.

¹⁸ <http://www.eia.gov/todayinenergy/detail.cfm?id=14431>

decreasing the price of oil, increasing global GDP, affecting geopolitics and the business models of oil and gas corporations, according to the study from PwC.¹⁹ Important shale oil resources are accessible and attainable across the globe, with the possible upshot of shale oil production limiting swelling international oil prices, ramifications of which will extend beyond the oil industry. Shale oil could revolutionise the world's economy through its ability to increase energy security, independence and affordability in the future. According to the PwC report of February 2013 "*Shale oil the next energy revolution*" global shale oil production would reach up to 12% of global oil supply by 2035.²⁰ As a result of this supply oil prices are 25-40% lower than they have ever been forecast before.²¹ Therefore, the potential competitors of crude oil are making big advances in the near future. The advantages of being climate neutral support renewable energy, and shale oil is sustained by its high potential investment opportunities, this could lead to increased competition within the global crude oil market.

¹⁹ <http://www.pwc.com/gx/en/oil-gas-energy/publications/pdfs/pwc-shale-oil.pdf>

²⁰ <http://www.pwc.com/gx/en/oil-gas-energy/publications/pdfs/pwc-shale-oil.pdf>

²¹ *ibidem*

3. Crude Oil crisis 2014-2015

3.1 Issues and Background

To get a better understanding of how the crude oil price dramatically fell from its mid-2014 high quotations of \$100 per barrel to its latest value of \$48 per barrel in September 2015, we need to take a step back to the mid-2000s. Oil price was rising due to a surge of global demand for oil, most notably in China, and there was not enough supply to match the stronger demand. This caused prices to spike, with oil floating at around \$100 per barrel between 2011 and 2014.²² The upswing of oil prices made energy companies, especially in the US, profitable enough to begin to extract oil from difficult drill places utilising techniques such as “fracking” and horizontal drilling; especially in North Dakota and Texas. The US is one of the largest importers of crude oil, so this was a cost saving strategy ahead of the high oil prices, and led to a boom in “unconventional” oil production. Since 2008 the US has added 4 million extra barrels of crude oil per day to the world market, according to new data from the Energy Information Administration.²³ Global crude oil production is about 75million barrels per day, so it’s a substantial increase.²⁴ However, the US oil surge did not make an impact on global oil prices, because in the same period geopolitical conflicts were escalating in crucial oil areas; Libya was in the midst of a civil war, whilst Iraq was facing pressure from ISIS. Those conflicts created supply outages of crude oil, thus maintaining prices at a high level. The outages resulted in over 3 million barrels fewer per day on the market. Nevertheless, by mid-2014 those struggles and outages were not so strong, and crude oil production in the US and worldwide supply kept growing fast. World demand began diminishing suddenly due to slowdowns in countries’ economic performance, especially in the Eurozone and Asia such as China and Japan. Japan’s economy was suffering a recession, with almost a 2% negative GDP growth. China, one of the largest oil purchasers in the world, was suffering, and still is, from a slowdown in its manufacturing sector.

The combined unexpected weaker demand and progressively growing supply led to a drop in oil prices from their peak in June 2014 of \$115 per barrel to around \$80 per barrel in mid-November. At this point OPEC’s decisions at their meeting on the 27th November 2014 in Vienna were crucial to the resulting further decline in oil price, which we are still experiencing

²² Plumer, B., 2015, “Why oil prices keep falling-and throwing the world into turmoil”, Vox Energy & Environment

²³ <http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=mcrfps2&f=m>

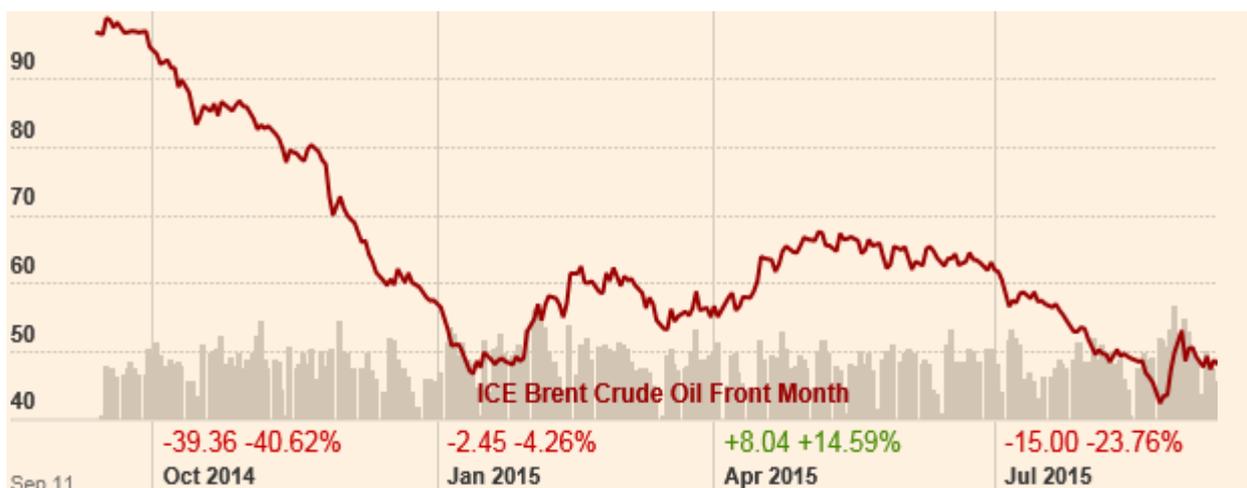
²⁴ Plumer,B., 2015, “Why oil prices keep falling-and throwing the world into turmoil”, Vox Energy & Environment

today. OPEC members debated on possible responses to this decreased oil price, with member countries like Venezuela and Iran calling for a reduction in crude oil production, so as to prop up prices which is essential for these countries to “break even” on their budgets to pay for accumulated government spending. Saudi Arabia, the second largest oil producer worldwide, opposed production cuts and were more willing to keep supply unchanged and for prices to drop.

The main idea was to keep OPEC’s market share and to throw out of the market possible US energy company competitors, by engaging in a price war. Crude oil extraction in Saudi Arabia or Kuwait is cheaper in comparison to the cost of pumping up shale oil in Texas and North Dakota. Furthermore, the rising dollar would hinder US domestic oil producers in their production, due to suffering further expenses in their extraction of crude oil. The final decision was to retain unchanged production targets and see how the market would react in the following months. OPEC Secretary-General Abdalla El-Badri reported this decision after the meeting; this resulted in a further decrease in the price of crude oil. The drop was very pronounced within days, falling from \$80 to \$70 per barrel and has kept falling until today, at \$50 per barrel at the end of July 2015. Very recently, on August 12 2015, the decision of the Chinese central bank to devalue the Yuan to boost the Chinese economy has marked a further decrease in crude oil prices, slashing down the price to \$43.3 dollars per barrel.

We can analyse this chart to gain a better understanding of the overall price trend.

Figure 3.1- ICE Brent Crude Oil daily price change at daily volumes



Source: Financial Times, <http://markets.ft.com/research/markets/Tearsheets/Summary?s=IB.1:IEU>

The figure 3.1 taken from the Financial Times commodities market data shows the one-year Brent crude oil daily price change, at constant daily volumes. On the y-axis we have numbers that reflect the value of crude oil in dollars per barrel and on the x-axis the time period divided into quarters, showing the beginning of each quarter. At the beginning of the first quarter crude oil was at its peak, reaching a value of more than \$90 per barrel, then a sharp decline made the crude oil price fall to \$80 per barrel, probably due to the combined weakening demand and growing supply as I described before. The price recovered somewhat, but dropped slightly below \$80 per barrel. From the middle of the quarter the dramatic fall of the crude oil price is shown as being more severe. The price plunged to \$70 per barrel and continued to collapse significantly, down to \$55 per barrel by the end of the quarter. This price downfall suggests the reaction of crude oil prices to the unchanged supply decision taken by OPEC's cartel. The price change of this quarter was a drop of almost 40%. The second quarter beginning January 2015 resulted in a further decline, with the crude oil price plummeting slightly below \$50 per barrel. It fluctuated around that price for some time and took off again around \$55 per barrel and subsequently increased and kept volatile slightly above \$60 per barrel in the mid quarter. From the mid quarter onwards the price fell again and fluctuated until the end of the quarter nearby \$55 per barrel. The overall price variation was not as strong as the previous quarter, resulting in a negative 4.26% change. The third quarter from April to the end of June shows a more optimistic scenario for the crude oil price. From April onwards the price went up steadily to \$65 per barrel and from the mid quarter onwards the price swung around \$65 per barrel. The overall change in the crude oil price in this quarter resulted in a positive 14.59 % difference. The last quarter from July to September saw an end to the optimistic upswing of the crude oil price of the previous quarter. From July onwards the price dramatically sunk to slightly below \$50 per barrel and subsequently after the mid quarter plummeted further, down to approximately \$43 per barrel. This extreme further price drop from the mid quarter on may be a result of the decision taken by the Chinese central bank to devalue the Yuan to boost the Chinese economy, having a negative effect on crude oil prices, as I mentioned before. Despite this drop the crude oil price turned upwards again in September, then declined slightly, averaging at the latest value of \$48 per barrel. This last quarter the overall price difference was not as pronounced as the first one, but still significant, since the drop resulted in almost negative 23.7% change.

Analysts and marketers wonder whether there will be a recovery or a further plunge in oil prices. According to Goldman Sachs analysts, crude oil prices will decrease further in the near future and next year, warning that prices could plunge near \$20 per barrel. They have reduced their

previous oil price forecasts and are expecting that WTI prices will be at \$38 per barrel in one month, so October (previously forecasted at \$45). In three months they are predicting \$42 rather than the expected \$49. In six months, it foresees \$40, down from \$54, and in 12 months \$45 from \$60. Goldman Sachs analysts argue that: *“The oil market is even more oversupplied than we had expected and we now forecast this surplus to persist in 2016 on further OPEC production growth, resilient non-OPEC supply and slowing demand growth, with risks skewed to even weaker demand given China's slowdown and its negative EM feedback loop”*.²⁵ Morgan Stanley analysts’ oil prediction is also fairly similar to that of Goldman Sachs, arguing that: *“We have been expecting the current downturn to be as severe as the one in 1986... but not worse than that”*.²⁶ However, when at the end of the week oil was again much lower, Morgan Stanley considered that the worst-case scenario might be starting up. The bank confessed to misjudging OPEC’s high-pitched production this year. High production is the primary reason the re-balancing of oil markets has not gained momentum, *“and means the oil crash could turn out to be worse than 1986; if so, it would be the worst in at least 45 years”* according to the bank.²⁷ This view of the bank’s analysts of an over supplied crude oil market is may supported also by the fact of Iran’s entry, enabling it to export crude oil. On July 14th 2015 a historic agreement was reached between Iran and a group of six countries guided by the United States where Tehran’s nuclear capability would be limited for over a decade if international oil and trade sanctions were lifted. The sanctions made by the US to Iran, date from 1979, when hostages were held at the US embassy in Tehran.²⁸ In 1995, the United States prohibited involvement with petroleum development in Iran. Two years later, the United States forbid almost all trade and investment actions with Iran by US persons, wherever located. In 2010, the United States approved the Comprehensive Iran Sanctions, Accountability, and Divestment Act. The regulation established that Iranian goods or services may not be imported except if they were gifts valued at \$100 or less; informational materials, or personal property of someone coming into the United States. US citizens could not export goods or services to Iran or, in general, to a third country knowing it is intended for Iran. The US government prohibits "servicing accounts of the government of Iran," including the country's central bank. Additional sanctions were added by the US in 2010. There were restrictions on companies for the delivery of equipment and expertise to Iran oil and chemical businesses.

²⁵ Martin, K., 2015

²⁶ Stern, C., 2015

²⁷ ibidem

²⁸ Levs, J., 2012

It banned groups that do business with financial institutions in Iran from holding accounts in the United States. Not only the US, but also the European Union imposed sanctions against Iran, especially the import of Iranian petroleum products, and the trade of Iranian gold, diamonds and precious metals were banned. The sanctions were numerous and strict. Let's analyse the implications of this deal from an economic point of view. One of the most important aspects of this US-Iran nuclear deal is that it could open up Iran's immense crude oil reserves to the rest of the world. After Europe and the US alleviate their endorsements, Iran can ramp up crude production and exports, wedging in this new era of low oil prices. This will not all happen immediately. It will probably take at least six months before there is any substantial oil impact from the deal, and maybe even longer than that. Even if everything goes to plan, the US and EU will not remove the sanctions on Iran until 2016. After that occurs, Iran can finally start selling some of the approximate 30 to 40 million barrels of oil it currently has deposited in floating tankers off its coast.²⁹ That could drive oil prices down considerably. However, after that, it may take many years before Iran will be able to produce at pre-sanctions levels. The country does have vast crude reserves, however that does not mean it's all coming immediately. Iran controls the fourth biggest crude oil and second largest natural gas reserves. Iran has been keen to have sanctions lifted, as its economy is tremendously reliant on the energy sector. Widespread sanctions, which targeted everything from shipping and exports to foreign investment and banking, have reduced revenues and blocked the industry. However, prior to Iran's significant intensification of world supplies, the US and its associates will seek to confirm that Tehran is maintaining its side of the bargain.

"Iran's oil and gas industry is in need of significant external investment — a golden opportunity for international oil companies," said analysts at Wood Mackenzie.³⁰ Tehran is settling an agreement to lock around \$100bn of new oil and gas pacts with western companies in the event of the lifting of sanctions.³¹ Major companies such as Shell and Eni, as well as commodities traders, visited Tehran this year in the hopes of accessing Iran's titanic resources. A major issue is how OPEC's cartel will react regarding production decisions on Iran's entry. It is still not clear, according to Russian energy Minister Alexander Novak, whether the other eleven members of the cartel will decrease their production. Although the group agreed

²⁹ Plumer, B., 2015, "What the Iran nuclear deal means for oil prices", Vox Energy & Environment

³⁰ Raval, A., 2015

³¹ *ibidem*

on a restraint to 30 million barrels per day, actual production levels have been over the maximum by at least 1 million barrels per day.³²

Mansour Moazami, deputy oil minister for Iran, called for an adjustment of production levels by OPEC members, to maintain a relatively stable price. However, the energy minister for Russia points out that shale oil drilling will more significantly impact oil price than Iran's return.³³ He argues that the impact will be low because the market has already calculated the expected growth in Iranian supply. Production costs for shale oil will be stronger in affecting prices.

The minister claimed that shale oil currently costs between \$50 and \$65 per barrel, which is similar to the market value of a barrel of oil today.³⁴ Many shale oil producers in the US have found that they have little to no profit margin, with cheaper crude oil leading to a reduction of drilling rigs in the United States from 1,600 to 650, around two thirds.³⁵ Although he also acknowledged that technological advances were allowing more effective, cheaper shale drilling processes. However, if prices of crude oil rise, then US shale drilling will increase. So overall we might conclude that crude oil prices are not rising in the near future, and it will be some time before this will happen.

3.2 Winners and Losers

Net oil importing countries are certainly enjoying the low oil prices. The US is the largest consumer of crude oil, importing almost 6.5 million barrels of oil per day. China and Japan, both net importers, are probably to benefit as well. Consumer spending is appreciating the low oil prices especially at the petrol stations. In Italy the drop in gas station prices has been dramatic, from a previous selling price of 1.8 euro per litre of gasoline, to a current average price around 1.6 to 1.64 euros per litre, so almost 20 cents less, a huge saving for Italian consumers. Drivers in the US are expected to spend around \$550 less on petrol in 2015 than in 2014, provided that prices remain at these levels, according to projections from EIA.³⁶ Airline companies are grateful for cheaper crude oil prices, saving on operating costs. A fall of \$1 in jet fuel price per barrel might lead to an extra \$1.7 billion in industry earnings, according to the International

³² Tully, A., 2015

³³ Tully, A., 2015

³⁴ *ibidem*

³⁵ *ibidem*

³⁶ <http://www.eia.gov/todayinenergy/detail.cfm?id=19211>

Transport Association.³⁷ US gasoline prices have been decreasing almost \$2.04 per gallon until today; this implies huge additional industry profits. The agricultural sector is also gaining from cheap oil prices, since it is an energy intensive sector.

Net oil exporter nations are not satisfied with the drop in crude oil prices. Russia is extremely dependent on energy production; 45% of the government budget comes from oil revenue.³⁸ The oil price drop caused local currencies to face severe setbacks. The fall of the Russian ruble has required the Russian central bank to raise interest rates up to 17%, an increase of 6.5%, to help the falling currency and to avoid a capital flight of people selling off the ruble.³⁹ US oil producers are partly suffering after the decision made by OPEC cartel, as prices are going steadily down, especially onshore places such as North Dakota and Texas. In its monthly report of 10th July 2015 EIA estimates that the output in key US shale oil sites such as Eagle Ford, Bakken, Utica and Niobara dropped by 45 000 barrels per day in May and 70 000 barrels per day in June, with expectations to drop further, by more than 90 barrels per day in July. US offshore production locations are not suffering as much from the low crude oil prices, maintaining output at very high rates. In the Gulf of Mexico production is still increasing by up to 105 000 barrels of oil per day and is expected to boost output by another 170 000 barrels per day by 2016. Therefore, US oil production has a positive and negative outlook in the drop of crude oil prices. Some of OPEC's members are suffering from the low crude oil price. Venezuela gains about 96% of its export revenues from oil-related sectors. According to the Central Intelligence Agency, these oil takings represent 40% of Venezuela's accounted earnings and approximately 11% of its GDP.⁴⁰ Consequently, it is clear that Venezuela is extremely weakened by fluctuations in oil prices and that a \$1 drop in per-barrel price means substantial damage to the government budget. Venezuela loses almost \$700 million for every dollar drop in crude oil price on annual average, according to Asdrubal Oliveros, economist for Ecoanalitica, a local consultancy interviewed by the Financial Times.⁴¹ He argues that; a \$20 drop in crude oil price would result in about \$14 billion dollars less in gross revenues for the country. He continues by saying that Ecoanalitica estimates that Venezuelan imports in 2015 will plunge to almost \$43 billion, restricting the movements of the government and reducing the amount of dollars available for imports. This will have an impact on people, because it will result in shortages. There have been shortages of everything from toilet paper to medical supplies and

³⁷ Rosenberg, J., 2014

³⁸ Plumer, J., 2015

³⁹ ibidem

⁴⁰ <https://www.cia.gov/library/publications/the-world-factbook/fields/2116.html#ve>

⁴¹ Schipani, A., 2014

basic foods such as milk and sugar are also scarce. People are queuing for a long time at the supermarket, to grasp the few items available, causing frustration and unhappiness. Venezuela and its state-run oil company have experienced considerable debts in past years, and the company's oil refineries and other assets could be confiscated in case of a default. Venezuela also has some financial liabilities such as debt payments to foreign companies, several of which have already withdrawn their business from the country, while waiting for the government to compensate. The government and state-run company's liabilities reach almost a total of \$128 billion, which have to be reimbursed over the next 24 years.⁴² Venezuela's economic condition due to the huge drop in oil prices is very compromising. Not only Venezuela; Nigeria is also suffering from the decreased oil prices. According to Nigerian newspaper portal "naji", 83% of Nigerian exports come from crude oil.⁴³ They continue by saying that if prices remain low, Nigeria will be pushed into further debt to make up for its oil revenue budget. Until now Nigeria's external debts have not been exceedingly high, but if government revenues decrease from a fall of crude oil prices, additional debt scheme accumulation might become mandatory. For the Nigerian economy oil is a fundamental source of revenue. Most of Nigeria's crude account and other savings plans are all funded by oil proceeds. If oil prices continue to fall, funds will run out, as will the nation's resilience to future crises. Nigeria has some money saved for such an oil price collapse, around \$4.1 billion in its excess crude account.⁴⁴ However, according to the World Bank the saved amount falls short of the suggested amount of \$6.3 billion.⁴⁵ There are fears that if oil prices keep falling, the government's saving ability could weaken. The dramatic price fall of crude oil has had a severe effect on Nigeria's national currency, driving inflation over 9%, this year in 2015⁴⁶. Similarly, Ecuador is not benefitting from the plummeting crude oil prices. Ecuador uses the dollar as its official currency. According to Juan Lorenzo Maldonado, an economist at Credit Suisse Group AG, dollarized economies are particularly challenged when exports revenues decrease, and especially when policy makers do not save enough to offset the fall in government income.⁴⁷ He continues by saying that dollarization can exist with poorer oil prices but the government has to make sure it is able to finance its debt. According to him Ecuador is able to sustain the shock. Another major issue according to Ecuador president Rafael Correa is that the reliance on the dollar means the

⁴² Schipani, A., 2015

⁴³ Ejiiofor, C., 2014

⁴⁴ Obiukwu, O., 2014

⁴⁵ ibidem

⁴⁶ Gallucci M., 2015

⁴⁷ Gill, N., 2015

government is unable to print more money to upturn the volume of currency flowing in the economy, hurting growth. Ecuador is dependent on crude oil for about half of its export revenue, and the state is taking actions to minimize the effects of lower oil prices on the economy. President Correa's administration has announced their support of public spending in order to heighten economic growth, while also tightening controls on imports to guarantee the required stream of dollars into its economy. But according to economists it will not be easy to maintain about \$7 billion of public spending with the current crude oil price. Economists say that the government will need to adopt budget cuts soon. These three OPEC members including Iran were more in favour of reducing crude oil production and to prop up prices. Higher crude oil prices would solve major economic issues. On the other hand, Saudi Arabia, OPEC's major oil supplier, is more optimistic about not cutting production and pushing down prices. By doing this many oil producers are suffering and risk exiting from the market. The question is how long can Saudi Arabia sustain this situation for its own economy? A recent article by CNBC conducts an interesting analysis of this specific issue.⁴⁸ Saudi Arabia crude oil production accounts for around 90% of exports and approximately 80% of total government income. The country's oil reserves are 270 billion barrels, according to US Energy Information Administration. This means that at current production levels of just below 10 million barrels per day, Saudi Arabia would be able to sustain this production rate for up to 75 years, however, if it stays at the current price of around \$40 per barrel, Saudi Arabia risks running out of cash reserves much sooner. The article points out that according to the "Big Crunch's" model, Saudi Arabia may exhaust its \$655 billion currency reserves as early as the end of 2018 if the price of oil does not increase. Barclays researchers came to an analogous conclusion, grounded on an analysis of Brent prices at \$50 a barrel. The investment bank argues that, without fiscal adjustments Saudi Arabia's government accounts and forex trading reserves could run out by 2019, assuming no issuance of debt. Data put together by the "Big Crunch" tell that Saudi Arabia needs prices to rise quickly. In the past year alone Saudi Arabia was forced to sell \$4 billion in bonds due to its critical situation, the country's largest sale of debt in eight years. According to the Financial Times, the head of SAMA (Saudi Arabian Monetary Agency), Fahad al-Mubarak, stated in July that borrowing increases are expected in the future.⁴⁹ According to Bloomberg, the country's authorities want to slash \$102 billion of capital spending due to falling oil prices. Public

⁴⁸ Wells, N., 2015

⁴⁹ Kerr, S., 2015

spending remains high historically;⁵⁰ with predictions that it will break 1.2 trillion Saudi Arabian riyals in 2015; approximately \$321.8 billion, almost double the 2010 value, according to Barclays researchers.⁵¹ The conditions are complicated and not so clear for future developments. Overall, crude oil exporting countries would go in favour of higher crude oil prices, but political tactics and decisions are currently dominating the crude oil market.

3.3 OPEC's influence in the 1973 crisis versus today's crisis

There is an interesting correlation between today's oil crisis and the one that happened in 1973. In both crises OPEC showed an authority and decision-making power in how to make crude oil prices fluctuate. The US has been in both cases subjects to be weakened and dominated by OPEC's decisions. OPEC's Arab members decided to impose an embargo against the US in 1973, during the Arab-Israel war, in revenge for the US re-supplying the Israeli military in order to gain leverage in post war peace negotiations. The attack by the Arabs was arranged for the day of amends (Yom Kippur), the holiest date of pray and fasting in the Jewish calendar. This war was called the "Yom Kippur" war of October 6 1973, and known as the fourth war between Arab-Israel. The motivations of this strategic attack were to regain some territory lost during the third Arab-Israel war in 1967. The Jewish nation took control of a territory that was four times larger than its previous size. Egypt lost the 23,500-square-mile Sinai Peninsula and the Gaza Strip and Syria lost the strategic Golan Heights. The stoppage was also extended to other nations that sustained Israel such as Portugal, South Africa and the Netherlands. The embargo was imposed to ban the exportation of crude oil to these countries, and simultaneously made reductions to oil production. At that time the US economy was extremely reliant on foreign oil and the embargo caused a devaluation of the US dollar, which made the situation even harder for the US. As crude oil prices are denominated in US dollar currency, a devaluation of the dollar coincides with a rise in value of the same barrel of oil for US consumers. After OPEC's decision, the oil prices doubled and quadrupled in just a few days, imposing high prices on consumers as well as challenges to the stability of worldwide national economies. At that time the exploration of new drilling sources in the US through fracking techniques was not so advanced. The US could not respond as much against the monopoly power that OPEC's cartel had in that period. Today we are facing a different scenario. The new extraction techniques in

⁵⁰ Martin, M., 2015

⁵¹ *ibidem*

difficult shale oil places recently developed by the US enabled it to significantly influence the global oil market, adding an important amount of oil production and limiting OPEC's cartel supremacy power. According to some analysts OPEC is now facing a different situation with respect to the oil embargo period. Since 1973 the global energy market has become more interdependent and integrated, as oil is no longer acquired and traded in large, long-term contracts, which prevented rapid adaptability of the market to changes in supply levels. Despite the big area covered by the OPEC cartel, current oil production is now even more widespread. The US and other countries such as Canada, Mexico and Russia can produce a great amount of oil in the short term, meeting the global oil demand. Crude oil is traded in a market that alters on a daily basis, so if one country's supply is cut off, other countries can enter to fill the gap. But notwithstanding these improvements and a more integrated market OPEC's market power results only partially limited. In both crises OPEC's decisions were brilliant and well planned. In 1973 OPEC could fully enjoy its monopolistic power, since no other nations could compete against their levels of production. OPEC's decision to cut production and push prices up to a very high level caused nations to be victim of OPEC and threatened by its supremacy.

Recent decisions were also wise, because maintaining an unchanged oil supply would considerably harm other oil producers such as Russia and especially the US. This strategy would not favour nations like the US, who need high oil prices to recover costs of onshore drilling sites. OPEC's members can withstand lower oil prices better since they have much lower costs in extracting oil, and their spare capacity is relatively higher with respect to non-OPEC countries. Saudi Arabia, as we saw in the first chapter, has the largest spare capacity in the world. In both crises the ultimate decision in the cartel was especially influenced by Saudi Arabia, showing that within the cartel the Saudis have major power.

Final Remarks

The main purpose of this research was to understand the crude oil market, by focusing on crude oil prices and studying the recent oil price collapse of 2014-2015. The change in the price of crude oil is guided by many factors; however, crude oil prices are especially driven by fundamentals (supply and demand) and political decisions. The crude oil market is heavily politicized, since most crude oil reservoirs are held by governments.

The oil market structure can be characterized as an oligopoly, since there are few participants that can sustain such an expensive business and manage a complex supply chain. The main competitors are the renewable energy sector and the unconventional oil production of shale oil. The first is sustained by its positive effect on the global environment and the second by making it an equivalent substitute for crude oil.

A variety of factors characterizes the crude oil price fall of 2014-2015. Firstly, an unexpected lower global demand on crude oil, driven by lower economic performance of some countries, especially in the Eurozone and Asia such as China and Japan. The second factor, the most prominent one to result in the crude oil price drop was the announcements by OPEC's cartel, after the meeting in Vienna in November 2014, to hold production targets unchanged and continue to boost oil production in the global market. This was essentially done to harm crude oil producers outside OPEC's cartel, such as the US and Russia, by engaging them in a price war. The drop that sentenced crude oil prices was especially driven by a political decision by OPEC's cartel, reinforcing the importance that the cartel still has today on the crude oil market. With respect to the embargo crisis of 1973, the influence of OPEC's cartel on the global crude oil market has been limited more since other countries are now able to supply significant quantities of crude oil in the short term. The crude oil market is far better integrated nowadays, and the introduction of new technology has enabled countries to extract oil from difficult shale oil formations and creating alternative energy fuels. The repercussion of this decision by OPEC's cartel has some negative and positive effects. Beginning with the positive; consumers and importers of crude oil are benefiting from lower crude oil prices. The negative outlook is for exporting countries who have to deal with the low oil prices. The US onshore sites, especially the ones concentrating shale oil production, are particularly suffering from the low oil price, they require higher prices to break even. Some OPEC members are suffering from the low crude oil prices. Venezuela, Ecuador and Nigeria gain most of their government budget from crude oil production revenue, and the low crude oil prices are having repercussions at a national level.

They have asked the cartel to cut production soon so as to prop up prices again. Saudi Arabia, the major producer of crude oil in the cartel, who is the primary driver in the ultimate decision of maintaining the supply unchanged, is also suffering from the low crude oil prices but keeping afloat better compared to previously mentioned countries. OPEC's price war strategy seems to be successful, but there are concerns about how long this will last. Many analysts argue that the international crude oil market is oversupplied, and price increases are not forecast for 2016. They expect instead that prices should drop even further next year. In general exporting countries are not benefiting from low crude oil prices, and the cartel's usual annual meeting at the end of the year, this year arranged for the 4 December 2015 in Vienna, will be extremely important to possible future price developments for the crude oil market.

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